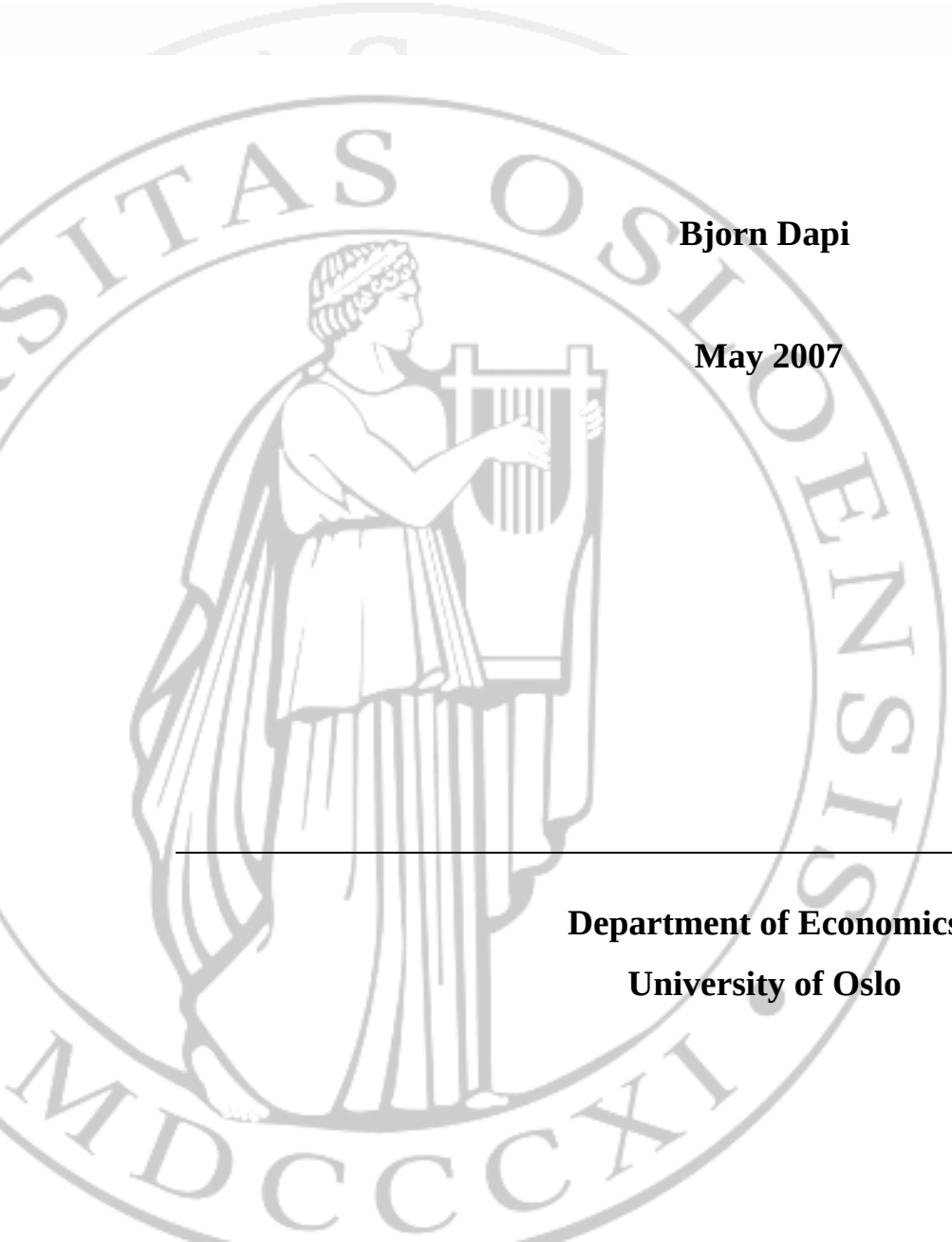
Master thesis for the Master of Philosophy in Economics degree

Economic Assimilation of Immigrants

A comparison between Norway and Canada



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Preface

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This master thesis is one of the biggest challenges I have faced. I feel happy and grateful for being one last proofreading away from being finished.

I would like to thank Bernt Bratsberg and Marianne Røed for helping me with getting started when I was restless and clueless. Also, my thanks go to Statistics Norway and the Institute for Social Research for providing the data and making them accessible.

I am most indebted to Erling Barth, my supervisor, for the insights, help and support throughout this semester.

I am thankful to my girlfriend, Tone, and to my friends. And I am not forgetting those friends that have left Oslo and returned home.

I know that I can't thank enough my parents and my brother in Montreal!
Immigrating to another country demands strength of will and sacrifice. Had it not been for my parents' determination and selflessness, my brother and I would stumble on a more difficult reality today.

Naturally, I am responsible for any errors and mistakes in this thesis.

Bjorn

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1. Introduction

The economic assimilation of immigrants is a topic of interest in the economics of immigration. In explaining what is usually meant by economic assimilation Borjas (1999) writes "... many studies implicitly or explicitly use a definition that equates the concept of economic assimilation with the rate of wage convergence between immigrants and natives in the host country". The wage convergence relies on a complex process that allows for immigrants' skills and knowledge to find productive use in the hosting labour market. This process depends on immigrants' motivation, immigration and integration policies in the host country, economic conditions, and cultural differences to name only a few of the factors identified in economic literature.

In this paper, I consider the economic assimilations of immigrants who go to two particular countries, Canada and Norway, with focus on the role of immigration policy. The Canadian immigration policy differs form the Norwegian one in that it allows for a substantial number of economic immigrants to enter Canada every year. This is a class of immigrants that gains entry to the Canadian labour market through a selection procedure and it has a considerable weight in the composition of immigrant cohorts.

In principle a selective immigration policy would allow for a less random distribution of immigrants' skills and it would shape this distribution so as to address certain targets. For example, the Canadian immigration policy has targeted demographic and economic growth (Green and Green (1996)). Thus the aim of my master thesis is to compare and investigate differences in the economic assimilations of immigrants in Canada and Norway that may arise from policy differences. For the purpose of comparison, I estimate the assimilation rates of Norwegian immigrants and I use the findings of Green and Worswick (2004), on Canadian immigrants.

Differences in the immigrants' assimilations in Canada and Norway may come from different immigration policies but may also be due to other factors. A consequence of the complexity of economic assimilation is that establishing causality is impossible without knowing all the other factors. Therefore, my goal is to investigate consequences that *may* be due to different immigration policies in Canada and Norway. Previous studies have already thrown light on the correlation between immigration policy and economic assimilation of immigrants, and three articles in particular serve as my starting point.

Borjas (1991) compares the skill composition of immigrant inflows in Canada and USA to evaluate the role of the Canadian immigration policy. USA's immigration is based on family reunification and it does not have selective economic criteria as is the case for the Canadian policy, which involves the "point system". Borjas (1991) finds that immigrants to Canada in the late 1960s in average had almost one more year of education than those to USA, at entry. In addition the wage disadvantage of immigrants, compared to natives, is greater in USA than in Canada. According to the author, an explanation of these findings is that the national origin groups that perform relatively well in Canada and USA are allowed to supply more migrants in the immigrant flow to Canada. This highlights the importance of a selective immigration policy in influencing the compositions of immigrant flow.

With regard to influencing the composition of immigrant inflows, Green and Green (1995) identify ways in which the Canadian government can affect it through policy instruments. Considering potential immigrants who do not have family ties in the country, allows for addressing the Canadian demand for particular skills. In addition, the skill composition can be influenced by giving different weights to different areas of origin. Thus, if there is a greater demand for high skilled labour in the domestic market, entry may be granted to more immigrants who come from areas that tend to supply high skilled workers. Indeed the authors find that the Canadian "point system" played a significant role in shifting the inflows' composition from low skilled immigrants to high skilled ones in the 1960s.

Constant and Zimmerman (2005) advocate the introduction of a selective immigration policy in EU, since the need for skilled labour in these countries is not satisfied by the present policy. They consider the role of an immigrants' legal status, soon after entering Germany and Denmark, on work participation and wage. Higher rates of assimilation are shared by economic immigrants, permanent immigrants and immigrants that know the foreign language. Their findings suggest that non-economic immigrants assimilate, in terms of earnings, with less success in the host country.

I will focus on three areas of in interest. First, do immigrants from different geographic origins in Norway, have different economic assimilation rates? If immigrants in Norway from all origins have similar economic assimilation rates, the adoption of an immigration policy similar to the Canadian one would not bring considerable changes in assimilation rates, because shifting the area-of-origin composition would not affect the average assimilation rate. If there is reason to suspect that the consequences of a selective immigration policy in Norway are very different from those in Canada, then comparing these two countries in order to infer the importance of that policy would be unsuitable.

Second, how do the immigrants' earnings disadvantages at entry and their accumulation of country specific human capital compare in Canada and in Norway? All other things being equal, due to the relative size of economic immigrants in Canada, an immigrant in Norway is less likely to be an economic immigrant (than an immigrant in Canada). Thus, following the reasoning of Constant and Zimmerman (2005), it may be expected that immigrants in Canada assimilate more easily. In order to fully consider the economic assimilation of immigrants, accumulation of firm specific human capital needs to be compared as well. However, due to comparison purposes, here I focus only on country specific human capital.

Third, considering the importance that immigration policy appears to have on the skill composition and area-of-origin composition of immigrants as advocated by the articles referred to earlier, I pay particular attention to these compositions when comparing the assimilation processes in Canada and Norway. Thus I inspect the economic assimilation of immigrants in the two countries when education and area of origin are controlled for. This is an attempt to compare assimilation rates of high skill immigrants and low skill immigrants in each of the two countries by separating immigrants with university education from the rest.

The layout of the thesis is as following. Part 2 is a comparison of the immigration policies in Norway and Canada during the 20th century. It is a descriptive account of the two policies and of the role that economic aspects have had on them. Part 3 accounts for the theory of economic assimilation of immigrants. Part 4 describes the data used and compares them to the data used in the Canadian article, in terms of how applicable they are to this type of analysis. Part 5 consists of the estimation analysis and the comparison between the Norwegian findings and the Canadian findings. The estimation results are derived from a simple OLS model and Stata 9.2 is the software used. Part 6 summarizes and concludes. Finally, a summary of this thesis is given in part 7.

2. Immigration policies in Norway and Canada in the 20th century

Immigration policy has been a regulatory tool in the second part of the 20-th century in Norway and Canada, as in most western countries. Although it has mainly been a means of achieving economic goals in both countries, it is well embedded in the political and historical context of the time. Their rationales can not be understood only on the grounds of economic needs of a country. However, when comparing the evolutions of the immigration policies in the two countries, in the second half of the 20th century, the Canadian immigration policy seems to be more explicitly influenced by economic needs than the Norwegian one.

In each of the two countries, 1967 is a crucial year with regards to immigration experience. The "point system" was introduced in Canada in 1967, allowing entrance to a new class of immigrants which was called the independent class (DeVoretz, 1994). According to Carling (1999) and Hagelund (2003), 1967 is the year when immigration significantly outnumbered emigration in Norway.

The "point system" is still in use and it is a method of selecting among those who want to migrate to Canada, according to domestic demand for particular types of skills and professions. The selection is carried out on the basis of the applicant's level of education, working experience, proficiency of English or French and other characteristics. Table 1 shows the categories and the maximum number of points that can be obtained in the point system, in 2007. A number of points are assigned to each category, according to the applicant's qualifications, and those who fulfil a minimum of 67 points are accepted.

Table 1. Categories in the Canadian point system

Selection Criteria	**Maximum Points**
Education	25
Official languages (English and/or French)	24
Employment experience	21
Age	10
Arranged employment in Canada	10
Adaptability	10
TOTAL	100

Source: "Citizenship and Immigration Canada" website, *http://www.cic.gc.ca/english/pub/imm-law.html#act7*, accessed 20/4-2007

The shift from an emigration country to an immigration one brought new challenges to Norwegian policy. In particular the increasing number of immigrants emphasized the need

for a more restrictive immigration policy, which gave rise to the "one year ban" in 1975. The Norwegian "one year ban" was a decision to stop issuing working permits to foreigners during that year. The official reason for this was to improve the conditions and to address the needs of the foreign workers, already settled in the country. However, through its many exemptions, the ban hardly affected European immigrants and it mainly stopped the entry of non-European ones. This suggests that controlling the composition of the immigration inflow to Norway was also a goal of the "one year ban" (Bø, 2002).

The post-WWII years, until 1967 for Canada and until 1975 for Norway[1], mark similar attitudes towards immigration in the two countries. Ambiguity and double standards were two common traits in the regulation adopted by Canada and Norway. Country of origin played an important role in the acceptance of economic immigrants in Canada. United Kingdom, United States and some Commonwealth countries were preferred sources and those that came from such countries were met with less demanding admission criteria than those who originated from elsewhere. In Canada, in an unclear way, the perceived need for the individuals' skill was part of the criteria. What further stressed the preference for country of origin was the fact that those, who did not come from a preferred country, faced more restricted rights to sponsor relatives (Green and Green, 1995). The Norwegian experience is affected by the presence of a labour shortage while the service and the industrial sectors were expanding from 1957 to 1971. Although it is unclear whether an immigrant needed a working permit before entering the country in those years, those that came as tourists could apply and receive working permit after having found a job offer in Norway. In 1971, in order to restrict immigration from distant countries (i.e. non European countries) applying for a work permit needed to be done from a country other than Norway (Bø, 2002).

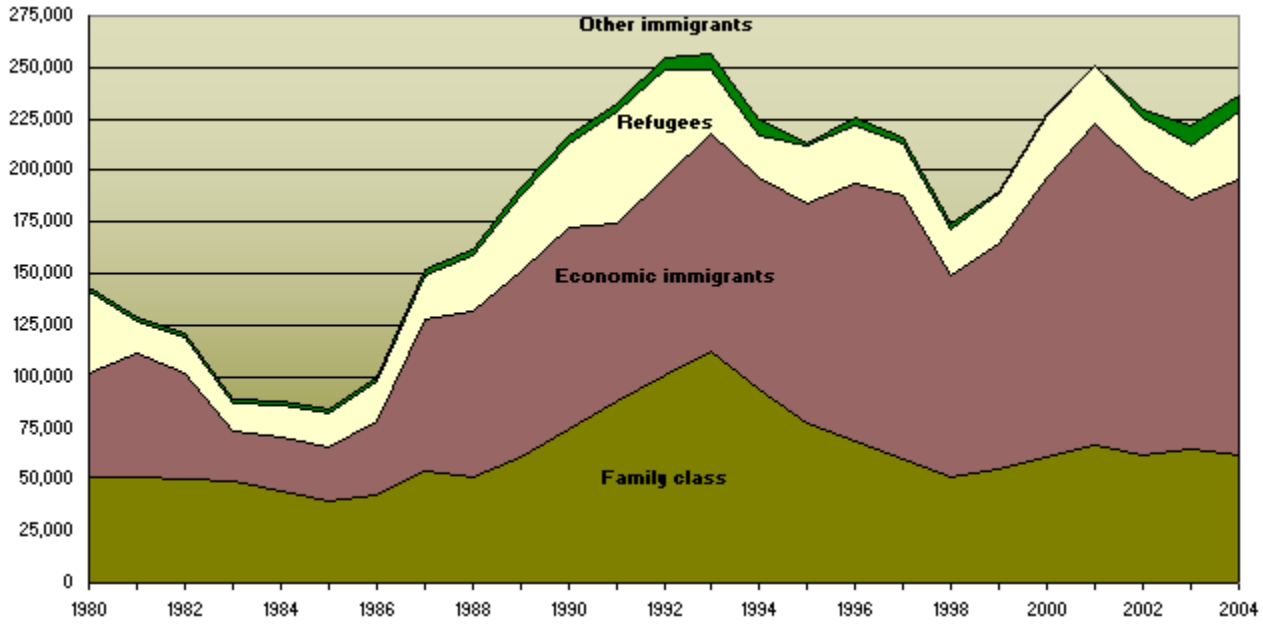
In the last 30 years, the immigration policies in Norway and Canada differ in how responsive they are to economic needs of the country. While the number of asylum seekers can not be predicted or determined in advance, more control is exercised by both countries on the number of non-asylum seekers. First, Canada and Norway are members of the UN High Commission for Refugees, and thus they accept an autonomously determined number of refugees every year. Second, all immigrants have the right to family reunification in the two countries.

Apart from asylum seekers and family reunification immigrants, a third class is granted entry to Canada through the point system, described earlier. This class consists of

[1] These are the years that mark the introduction of the point system in Canada and the one year ban in Norway.

economic immigrants and its size is determined as a residual every year, in Canada. This means that after the total number of immigrants that will be accepted the following year is agreed upon by the Canadian Parliament, the refugee and the family reunion classes are given priority. The reasons for prioritising these classes are humanitarian treaties and the right of Canadian residents to reunify with their relatives (Green and Green, 1995). The difference between the predetermined total and the sum of the priority classes gives the size of the independent class (i.e. the class of economic immigrants). However the size of the independent class is still substantial, as figure 1 shows.

Figure 1. Canada - Permanent Residents by Category, 1980 to 2004



Source: "Citizenship and Immigration Canada" website,
http://www.cic.gc.ca/english/pub/facts2004/permanent/1.html, accessed 21/4-2007

Both figure 1 and table 2, below, provide indications of the relative sizes of each immigration group (called permanent residents) in Canada from 1980 to 2004. Table 2 gives the percentage distribution of the permanent resident categories, while figure 1 shows the magnitude of these categories.

The refugee class has had a quite stable relative size during these years, ranging between 10% and 20%. The two largest categories of immigrants in Canada are the family class and the economic immigrants, with the last one becoming predominantly larger after 1995. The total number of immigrants has increased steadily from the early 1980s until the early 1990s, following the inflows of the family class and the economic immigrants. After the early 1990s the pattern is less clear, and the total number of immigrants follows more closely the fluctuations of the independent class.

Table 2. Canada - Percentage of permanent residents by category

Category	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
	Percentage distribution										
Family class	35.9	39.9	41.5	54.9	50.4	46.7	42.8	35.4	31.8	31.8	34.5
Economic immigrants	34.9	46.8	42.7	27.1	29.5	31.0	36.1	48.7	49.7	47.1	45.2
Refugees	28.2	11.6	14.0	15.7	17.4	19.9	19.3	14.1	16.6	19.3	18.6
Other immigrants	1.1	1.6	1.9	2.4	2.6	2.5	1.9	1.8	2.0	1.9	1.7
Category not stated	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
			Percentage distribution										
37.8	39.7	43.9	42.0	36.4	30.2	27.8	29.2	29.1	26.7	26.7	27.2	29.4	26.4
37.2	37.6	41.2	45.6	50.1	55.5	59.4	56.2	57.5	59.9	62.1	60.2	54.7	56.7
23.2	20.5	11.9	9.1	13.2	12.6	11.3	13.1	12.8	13.2	11.1	11.0	11.7	13.9
1.8	2.2	3.0	3.3	0.4	1.7	1.6	1.5	0.5	0.2	0.1	1.6	4.2	3.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100.0	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source: "Citizenship and Immigration Canada" website, *http://www.cic.gc.ca/english/pub/facts2004/permanent/1.html*, accessed 21/4-2007

Thus immigration policy in Canada targets economic needs of the country through a selective process that results in the economic class of immigrants. This is a crucial distinction from the immigration policy adopted in Norway. What highlights this difference even further is the large relative size that the economic class carries in the Canadian inflow of immigrants. In a sense, if the number of economic immigrants were small compared to other types of immigrants in Canada, the economic role of the Canadian immigration policy would not necessarily be different from the economic role of the Norwegian immigration policy. But, the relative size of the independent class in Canada indicates the level of influence that economic factors have in shaping the Canadian immigration policy.

3. Theory of economic assimilation

The immigrants' economic assimilation received attention in academic literature in 1978 for the first time, by Barry Chiswick. In his paper, "The Effect of Americanization on the Earnings of Foreign-born Men", he used cross section data from USA and explored what affects the earnings profile of immigrants in USA and how these profiles compare to USA natives. More precisely Chiswick pooled natives and immigrants in order to compare the effects of education and working experience on earnings for the two groups. He based his analysis on the human capital accumulation model developed by Mincer (1974). The equation that describes natives' earnings takes the following form:

$$\ln Y_{n,i} = \ln Y_0 + rS_i + b_1 T_i + b_2 T_i^2 + U_i \quad (1)$$

The dependent variable denotes the natural logarithm of the earnings of a native individual. S_i and T_i describe years of education and years of labour market experience respectively (For a more detailed discussion of the model see Mincer (1974)).

Concerning the immigrant case, it is of particular interest to distinguish between the source country's labour market and host country's one. In fact, if these two markets were identical, a discussion on economic assimilation of immigrants would be futile. Thus in the immigrants' earnings equation it is acknowledged that the human capital accumulation profile consists of a before migration phase and an after migration one, as shown below (a and b subscripts stand for after and before migration).

$$\ln Y_i = \ln Y_0 + r_b S_{b,i} + r_a S_{a,i} + b_1 T_{b,i} + b_2 (T_{b,i})^2 + b_3 T_{a,i} + b_4 (T_{a,i})^2 + U_i \quad (2)$$

By noting that $S_{b,i} + S_{a,i} = S_i$, $T_{b,i} + T_{a,i} = T_i$ and assuming that $r_a = r_b$, equation (3) can be deduced from equation (2).

$$\ln Y_i = C_0 + rS_i + C_1 T_i + C_2 T_i^2 + C_3 (T_{a,i}) + C_4 (T_{a,i})^2 + U_i \quad (3)$$

In addition, the variable that describes years of labour market experience in the host market ($T_{a,i}$) is substituted by a measure of years since migration (YSM_i). This would be inadequate for immigrants who continue their education in the host country because years since migration will always be larger than years of working experience after migration. The

variable $T_{a,i}$ reflect years of working experience after education in the host country (if any) rather than after migration. Although a similar point may be raised also for unemployment after migration, I currently present the model proposed by Chiswick (1978) and address the unemployment issue later on. Equation (4) is the same as equation (3) except for the substitution of $T_{a,i}$ with YSM_i:

$$\ln Yi = C_0 + rS_i + C_1T_i + C_2Ti^2 + C_3(YSM_i) + C_4(YSM_i)^2 + Ui \quad (4)$$

In the cross section model, natives and immigrants are pooled together, as shown in equation (5). A dummy variable, I_{dummy}, is added to distinguish between immigrants and natives. Also a set of variables (X_{ji}), that control for socio-economic characteristics such as marital status, gender, country of origin, etc, is included.

$$\ln Yi = C_0 + rS_i + C_1T_i + C_2Ti^2 + C_3(YSM_i) + C_4(YSM_i)^2 + C_5(I_{dummy}) + \sum_{j>5}(C_jX_{ji}) + Ui \quad (5)$$

This was the first step in the studies of economic assimilation of immigrants. Since then, the academic literature on this topic has developed and become more sophisticated. In particular the *entry effect*, the *years effect*, the *period effect* and the *cohort effect* are identified in this literature. In the following sections I consider each of these concepts, in an attempt to better understand what influences the quantifying of immigrants' economic assimilation.

3.1 The entry effect

In equation (5), C_5 is interpreted as the average difference in earnings between immigrants and natives at entry (i.e. $YSM_i = 0$). Whereas $\partial(\ln Yi)/\partial(YSM_i) = C_3 + 2*C_4*YSM_i$ describes the growth rate of immigrants' earnings in addition to the growth rate shared by all workers in the host economy (i.e. $\partial(\ln Yi)/\partial(T_i)$). A negative C_5 and a positive $\partial(\ln Yi)/\partial(YSM_i)$ are interpreted as immigrants experiencing lower earnings than natives when $YSM_i = 0$, but higher earnings' growth over the years. This has been considered as indication of immigrants' assimilation (e.g. Chiswick (1978), Carliner (1980)).

The gap between average earnings of immigrants at arrival and average earnings of comparable natives is referred to as the *entry effect*. The lower immigrant earnings at $YSM_i=0$ may find explanation in the importance of country specific human capital (Bloom et al. 1995). Migrants that have just moved to a new country have not yet had the possibility to collect such knowledge. They are less familiar with customs that are particular to the host

country than what natives are. Also the benefits that arise from social networks as facilitators in the job matching process accrue exclusively to natives. This is the case because immigrants are less likely to be introduced to such networks in the host country at arrival.

The difference between immigrants and natives in the level of firm-specific human capital can offer some explanation on the *entry effect*, as well. At arrival, immigrants have not had any chance to accumulate this kind of capital. On the contrary, natives are in a leading position in this respect. While some general human capital of immigrants may find valuable use in the new host labour market, their firm-specific human capital does not. This is not particularly due to immigration per se, but rather due to the change of employing firm.

A third disadvantage that immigrants face at arrival in the host country, and that is likely to be reflected in their earnings, is lack of language competency. In a way this is closely related to country specific human capital, but the special attention that it has received in the literature reflects its particular significance. For example, Chiswick and Miller (2001) bring evidence on the complementarity of language skills and human capital. Similarly on the importance of language skills, Friedberg (2001) eloquently writes "…schooling in the host country may aid in the transferability of an immigrant's human capital by giving him the language proficiency needed to literally translate his skills."

From an employers' perspective, there is more risk involved in hiring a recent immigrant than hiring a native (Chiswick (1978)). The productivity of an immigrant applicant for a vacancy may be more obscure to employers, because they are likely to know less about the immigrants' education, qualification and credentials when compared to those of natives. In turn, this disadvantage may persuade immigrants to accept lower paid jobs than they would have accepted if they were not immigrants. Thus, the lower reservation wage of immigrants at arrival is another factor that may lead to the observed *entry effect*.

An additional disadvantage that immigrants face, perhaps not only at arrival, is discrimination. For example, compared to a situation without discrimination, if immigrants that constitute a visible minority are discriminated against, they are likely to have even lower reservation wages than other immigrants. This would further decrease the average earnings of immigrants at arrival and hence it would further emphasize the *entry effect*.

One important characteristic of the *entry effect* is that it strongly depends on how different the source country is from the host country. If an immigrant comes from a neighbouring country, he or she is more likely to be acquainted with the host country's customs and language. His qualification are more likely to receive due recognition in the host labour market, and discrimination might play a minor role. So the average wage gap

between recent immigrants and natives may be larger if most of immigrants come from a country that is culturally distant from the host one, than if the source and the host country are culturally closer.

With the exception of discrimination, as a potential cause for the *entry effect*, the level of country specific human capital, the level of firm specific human capital, the foreign language competency and the credibility on immigrants' qualifications have a time dimension. They influence the *entry effect* (at arrival), but they are likely to change along the years that one spends in the host country. And this shifts the attention from the *entry effect* to the *years effect*.

3.2 The years effect

The years effect describe how the immigrants earnings profile changes, compared to the natives one, with every year spent in the host country. A positive $\partial(\ln Y_i)/\partial(YSM_i)$ has been considered to indicate that the initial difficulties, faced by immigrants, tend to be overcome with time. It is obvious that this YSM effect belongs to changes in immigrants' earnings only, because years since migration are equal to zero in every calendar year for a native. However the years effect do not consist only of the YSM effect.

Considering equation (5), a positive $\partial(\ln Y_i)/\partial(YSM_i)$ implies that the rate of increase of earnings is higher for immigrants than for natives. Since $\partial(\ln Y_i)/\partial(T_i)$ measures the average return to one year of being in the labour force, and consequently it is assumed to be the same for both groups in equation (5), the immigrants' earnings grow more with every year spent in the host country.

However, to assume that $\partial(\ln Y_i)/\partial(T_i)$ is the same for immigrants and natives may be misleading due to factors like discrimination towards immigrants, differences in unemployment levels between immigrants and natives and differences in motivation. Whether $\partial(\ln Y_i)/\partial(T_i)$ is larger for natives or for immigrants is an empirical question because those factors point in different directions.

Since there is reason to believe that (compared to natives) discrimination might force immigrants to accept less paid jobs, the return to one year of working experience of an immigrant may be lower. Furthermore, how unemployment affects immigrants relative to natives is not controlled for in equation (5). And since immigrants are more vulnerable to local unemployment than natives (Bratsberg et al. (2006)), the return to T may be lower for immigrants due accepting less paid jobs in times with high unemployment.

On the other hand, immigrants' return to T may be argued to be higher on motivation grounds. Some form of positive selection on who chooses to emigrate from the source country may occur, so that immigrants are a group of particularly motivated people (Carliner 1980). Thus, compared to natives, immigrants may be more able and they may work more in average and have higher returns to a year in the labour market. This argument is, however, very sensitive to the cause of emigration. In other words, immigrants' motivation in the host country may depend on whether migration was caused by economical reasons or non-economical reasons.

Hence the years effect consist of the YSM effect ($\partial(\ln Y_i)/\partial(YSM_i)$) and the experience effect ($[\partial(\ln Y_i)/\partial(T_{i,N}) - \partial(\ln Y_i)/\partial(T_{i,I})]$). These two effects may reflect accumulation of different types of human capital. The YSM effect may reveal the accumulation of general human capital of immigrants. In particular the country specific human capital of immigrants increases as their language skills improve and they become more familiar with customs in the host country.

The experience effect may reveal differences in the accumulation of firm specific human capital between immigrants and natives. Immigrants may have higher job mobility because improving language skills, improving knowledge about the new labour market and more credible credentials may persuade them towards jobs that give a higher payoff than the reservation wage that they started with. The quit rates, associated with this higher mobility, may discourage both employers and immigrant employees from investing in firm specific human capital (Chiswick 1978b). But higher motivation from immigrants may persuade employers to invest relatively more in firm specific human capital. Thus the sign of the experience effect remains to be determined empirically, and it can be controlled for by adding interaction variables between the immigrant dummy and the experience variables (i.e. T_i, T_i^2) to equation (5), as shown below:

$$\ln Y_i = C_0 + rS_i + C_1T_i + C_2T_i^2 + C_3(YSM_i) + C_4(YSM_i)^2 + C_5(I_{dummy}) + C_6(I_{dummy}*T_i) + C_7(I_{dummy}*T_i^2) + \sum_{j>7}(C_jX_{ji}) + U_i \qquad (6)$$

Borjas (1985) pointed out that cross section analysis gives a biased estimate of assimilation. He identified the *cohort effect* and suggested an estimation model to control for this effect.

3.3 The cohort effect

Suppose that immigrants, who have recently entered the host country, tend to have a lower quality of human capital than immigrants who have come with earlier arrival cohorts. And furthermore, suppose that the quality of human capital is not controlled for in the empirical model. If a cross section analysis is used, the coefficient estimate of YSM_i will be biased upwards. The effect of years since migration will be overestimated because the better human capital quality of earlier immigrants will be misleadingly attributed to their longer years since migration. Obviously if the contrary is true, the effect of YSM will be biased downwards.

This observation stresses the importance of distinguishing between the *years effect* and the *cohort effect*. The first one describes the changes in earnings of immigrants that arise from spending more time in the host country. The second one is related to time of arrival of immigrants, or cohorts of immigrants. This effect is owed to differences in arrival cohorts that arise from characteristics that are unobservable or uncontrolled for.

The *cohort effect*, unlike the *entry* and *years effect*, represents a departure form economic theory in the sense that it is not a result of human capital model. It represents an estimation bias that is neither due to changes in the overall human capital of immigrants, nor due to changes in a particular kind of human capital. Instead, this effect is more closely related to empirical issues. And for isolating this effect, longitudinal data are needed.

Longitudinal data would allow for observations of the same group of immigrants in various years, after the arrival year. The same arrival cohort of immigrants could be tracked over the years since arrival, and an YSM profile could be estimated, which would be specific to that cohort. Equivalently a number of cross section samples, obtained in various calendar years, could be pooled together. This would allow for estimating YSM profiles of more than one cohort, thus giving an insight into the *cohort effect* and the *years effect*. A version of the regression model used in this kind of analysis pools both immigrants and natives and includes arrival cohort dummies, as shown in equation (6) (although a more sophisticated version would also include interaction variables between YSM_i and cohort dummies).

$$\ln Yi = C_0 + rS_i + C_1T_i + C_2Ti^2 + C_3(YSM_i) + C_4(YSM_i)^2 + C_5(I_{dummy}) + C_6(I_{dummy}*T_i) + C_7(I_{dummy}*T_i^2) + \sum_{j>7}(C_jX_{ji}) + \kappa_1(coh_1) + \kappa_2(coh_2) + \kappa_3(coh_3) + \ldots\ldots\ldots \kappa_n(coh_n) + U_i \qquad (6)$$

Even though the above model controls for the *cohort effect*, it still gives a biased estimate of the *years effect*. In equation (6) the *period effect* is not taken into account.

3.4 The period effect

If data are sampled out of several cross sections, according to capital accumulation theory earnings of the same individuals will differ from one cross section to the other. Other things being equal, the difference in earnings of the same individual from one cross section to the other will be due to a change in years of experience for a native and a combination of changes in years of experience and years since migration for an immigrant. For two cross sections, X years apart, total years of experience change by X years for everyone and years since migration change by X years for immigrants.

In addition earnings of the same individual may change, after X years, because of different economic conditions. How the business cycle fluctuations or the economic growth rate affects the earnings of natives and immigrants is defined as the *period effect*. More precisely, if the economic conditions are better, X years later, $\partial(\ln Yi)/\partial(YSM_i)$ will be biased upwards because the increase in immigrants' earnings that is a result of better economic conditions will be attributed to the *years effect*.

To take into account the *period effect*, Borjas (1999) suggests a model where separate regressions are run on immigrants and natives. While the logarithm of earnings is the independent variable for both regressions, the independent variables in the natives' equation include a matrix of socioeconomic characteristics, total years of working experience and a set of dummy variables for identifying from which cross section the observation comes from. The last set of variables controls for the *period effect* because identifying which cross section the observation comes from is the same as identifying the years' interval when the observation is taken. The immigrants' equation includes similar variables as in the natives' equation, and is augmented by a years-since-migration variable and a set of dummy variables that identify the cohort arrival. The immigrants' equation has an identification problem since the cohort of arrival dummy and cross section dummy identify, respectively, the arrival year and the observation year. And these last two, together with years-since-migration variable are linearly dependent.

Since this identification problem does not arise in the natives' equation, Borjas suggestion was to estimate the *period effect* from this equation and to assume that immigrants respond to economic conditions in the host economy in the same way as natives. In "Handbook of Labour Economics" (1999), Borjas writes that "[a] useful way of thinking about this restriction is that the period effects for immigrants are calculated from *outside* the immigrant wage determination system". One implication of this assumption is that the

period effect has little explanatory power of immigrants' earnings patterns, resulting in the higher importance of the other effects.

There are two issues that arise from this approach to the identification problem. First, it is worth questioning whether the assumption is realistic. In other words, enquiring whether immigrants respond to changes in macroeconomic conditions the same way as natives. However, this question is of empirical nature and given the identification problem it can not be answered unless a different restriction is made, or a different control for macroeconomic conditions is chosen. Second, it may be important to consider which group of natives to use for estimating the *period effect*. Since natives of different age, tenure, gender and education are likely to respond differently to changes in economic conditions, the size of the *period effect* is very sensitive to which control group is chosen. Thus, the more responsive a group of natives is to macroeconomic conditions, the larger will the macro effect on immigrants' earnings be assumed to be.

For example, Green and Worswick (2004) try to explain the decreasing pattern of entry earnings across cohorts of immigrants in Canada. The control group used by previous studies consists of natives whose age is comparable to immigrants. And these previous studies find that the *period effect* has little explanatory power for the pattern of immigrants' entry earnings, resulting in most of the explanatory power being attributed to the *cohort effect*. The control group used by Green and Worswick, consists of natives that enter the labour market for the first time on the year that immigrants enter Canada, on the justification that these groups are comparable in terms of working experience in the Canadian labour market. As one might expect, the entry earnings of new labour market entrants are sensitive to macroeconomic conditions. As a result the *period effect* is assumed to play a major role for immigrants too. In fact the authors find that half of the declining pattern in immigrants' entry earnings can be explained by the fact that different immigrants' cohorts found different macro conditions when they entered Canada.

4. Data

Whether to use longitudinal data or cross section data is of large importance when estimating immigrants' economic assimilation is crucial. The first to observe the consequences of cross section analysis was Borjas (1985). As noted earlier, cross section analysis ignores the cohort effect and gives a biased estimate of the years effect. In this regard, Borjas (1985) writes "[…] cross section studies of immigrant earnings provide useless and misleading insights into the process of immigrant assimilation into the labour market." Although longitudinal data fit best this type of analysis, they are difficult to build. Thus he suggested the use of pseudo-longitudinal data instead. Obviously the better the quality of the pseudo-longitudinal data (i.e. the more similar pseudo-longitudinal data are to longitudinal data), the more reliable are the estimation results. This is relevant because it should be noticed that the data used in the Canadian article are closer to longitudinal data than the data that I use in the empirical analysis.

The Norwegian data set comes from Statistics Norway (Statistisk Sentralbyrå) and it is a yearly collection of earnings and other social characteristics of individuals. I use a subset that was made accessible by the Institute for Social Research (Institutt for Samfunnsforskning). This subset consists of males between 25 and 64 years old. The data set is collected from 1997 to 2003 and it involves 354 125 native Norwegians and 225 432 immigrants. Table 3 gives the summary statistics of some of the variables, separately for immigrants and natives. These are weighted summary statistics to account for the likelihood that an individual from a particular sector is included in the data set. The regression analysis that follows in the next section takes account of these weights.

Years Since Migration (YSM) is calculated as *observation year* minus *year of immigration*. *Years of working experience* is derived as *age* at *observation year* minus *years of education* minus *16* (because *years of education* reveals only education that is higher than compulsory schooling in Norway). A few puzzling negative values were derived form these calculations, which I considered as minor mistakes in the process of data registering. I replaced these negative values with zero. In addition there are 1167 observation that have *immigration year* equal to 2004, which contradicts with the fact I did not change these values of *immigration year*.that data is collected from 1997 to 2003 because this is a relatively small number of observations probably due to registering errors too.

Monthly earnings include wage, bonus payment and overtime payment on the monthly basis. Notice that the maximum value of monthly earnings is larger for immigrants

than for natives, but the immigrant mean value is lower. Not surprisingly, immigration year and YSM is equal to zero for natives. In average immigrants have 2,35 years of working experience less than natives, but they have in average 0,61 years of education more than natives.

Table 3. Summary statistics on Norwegian data

Natives	Variable	Obs	Weight	Mean	Std. Dev.	Min	Max
	monthly earnings	354125	655605	25168,27	11099,93	0	218663,6
	age	354125	655605	41,89	10,40	25	64
	observation year	354125	655605	2000,11	1,99	1997	2003
	missing education	354125	655605	0,16	0,37	0	1
	immigration year	0	0	-	-	-	-
	YSM	354125	655605	0,00	0,00	0	0
	Work experience (years)	354125	655605	22,81	10,75	0	48
	education years	308611	549127	3,68	2,63	0	12
Immigrants	Variable	Obs	Weight	Mean	Std. Dev.	Min	Max
	monthly earnings	225432	400605	23267,30	12523,70	0	297692,7
	age	225432	400605	40,04	9,54	25	64
	observation year	225432	400605	2000,33	1,95	1997	2003
	missing education	225432	400605	0,17	0,37	0	1
	immigration year	225432	400605	1985,06	11,89	1936	2004
	YSM	225432	400605	15,30	11,70	0	64
	Work experience (years)	225432	400605	20,46	9,63	0	48
	education years	188909	333370	4,29	3,10	0	12

The Canadian dataset[2] is build of data from the Immigrant Database (IMDB) and Survey of Consumers Finance (SCF). It involves data from 1980 to 1997 and the authors focus on males between 25 and 64 years old.

The Canadian data are closer to longitudinal data than the Norwegian data because Green and Worswick (2004) use records of the same immigrants in all the successive years (between 1980 and 1997) after entry in Canada. For example, immigrants that entered Canada in 1987 are kept track of every year from 1987 to 1997.

This is not the case for the Norwegian dataset. Data on immigrants and natives in Norway in a particular year (say 2001) are randomly drawn from the whole population of 2001. Thus, the individuals that are drawn in one year are not necessarily included in another year. Although this means that the Canadian data are more suitable for the analysis of immigrants' economic assimilation it does not suggest that the use of Norwegian data is misleading.

[2] For a detailed description of the Canadian data set, see Green and Worswick (2004), page 5-8.

5. Estimation analysis

5.1 Estimates of cross section model

The OLS estimation results of the cross section analysis are summarized in table 4. The regression equation is an augmented version of the one proposed by Chiswick (1978) which uses the natural logarithm of the monthly wage as the dependent variable. Included in the independent variables are an immigrant dummy variable (Idummy), a second degree polynomial of years since immigration (YSM, YSMsq) and a second degree polynomial of total working experience (T, Tsq). Interaction variables between Idummy and the variables T, Tsq are included to estimate the experience effect.

Education experience is described by edu_years, which shows the number of years of schooling beyond the compulsory 10 years in the Norwegian teaching system. Unfortunately, there are some missing values in this variable. Instead of ignoring this fact and considering those individuals as if having fulfilled only the compulsory education, I include a dummy variable to account for the missing values (edu_years_miss). This is an important variable following the belief that it identifies information that is missing to us, but that information is unlikely to be hidden to the employers. Thus there is reason to suspect that the earnings of these individuals are different from those who have only 10 years of schooling.

Since the data is collected from 1997 to 2003, a dummy variable for each year from 1998 to 2003 is incorporated in order to account for trends in the economy during these years, relative to 1997. In addition, another set of dummy variables is included to control for continent of origin of immigrants. Europe is divided into east and west, keeping eastern Europeans as a reference group. With the worldwide influence of English in business interactions, a dummy variable (english) that identifies English mother-tongue speakers is integrated to assess any advantages (or disadvantages) of English mother-tongue speakers over the rest of immigrants. And finally the last two variables (excluding the constant) allow for interactions between the immigration dummy and the variables edu_years, edu_years_miss.

Table 4. OLS coefficient estimates of the cross section model

Variables	Coef.	Std. Err.	P value
Idummy	-0,1489	0,0079	0,000
YSM	0,0052	0,0003	0,000
YSMsq	0,0000	0,0000	0,000
T	0,0278	0,0004	0,000
Tsq	-0,0005	0,0000	0,000
Edu_years	0,0517	0,0004	0,000
Edu_years_miss	0,0603	0,0027	0,000
Obsyear1998	0,0707	0,0027	0,000
Obsyear1999	0,0890	0,0027	0,000
Obsyear2000	0,1193	0,0027	0,000
Obsyear2001	0,1548	0,0027	0,000
Obsyear2002	0,2084	0,0026	0,000
Obsyear2003	0,2319	0,0026	0,000
Africa	-0,1220	0,0050	0,000
Asia	-0,0905	0,0038	0,000
North & Central America	0,1932	0,0068	0,000
South America	-0,0762	0,0065	0,000
Australia & Oceania	0,1952	0,0165	0,000
Western Europe	0,2542	0,0036	0,000
English	0,0654	0,0044	0,000
TxIdummy	-0,0116	0,0006	0,000
TsqxIdummy	0,0002	0,0000	0,000
edu_yearsxIdummy	-0,0101	0,0006	0,000
edu_years_missxIdummy	0,0083	0,0046	0,073
Constant	9,3948	0,0047	0,000
Nr. of observations	579557		
R squared	0,1398		

From the results in table 4, with the exception of the coefficient of edu_years_missxIdummy (the interaction variable between Idummy and edu_years_miss), the coefficient estimates have p-values that are smaller than 1%. Notice that the coefficients of observation year variables, suggest a gradual increase of average wage level in Norway from 1997 to 2003. In 2003 wages are approximately 23% higher than in 1997, in nominal terms. Considering the area of origin variables, African, Asian and South American immigrants earn less than Eastern European immigrants in Norway, but a positive coefficient of Western Europe suggests that western European immigrants (who are not English mother-tongue speakers) have higher earnings than their Eastern neighbours. Also English mother-tongue speakers earn in average 0,0654 log points more than those who do not have English as a first language, in the Norwegian labour market.

The coefficient of Idummy needs to be interpreted carefully considering that, if we exclude the interaction variables, there are four types of dummy variables in the regression equation (i.e. education, observation year, continent of origin and English mother-tongue

speaker). The coefficient -0,1489 means that, in 1997's monetary terms, a hypothetical immigrant who has just entered the Norwegian labour market and the labour market in general (i.e. YSM = T = 0), who has fulfilled only 10 years of schooling, who comes from Eastern Europe and who is not an English mother-tongue speaker[3], earns 0,1489 log points less in average than a native Norwegian who also just joined the Norwegian labour market for the first time, and who has completed the first 10 years of education.

The earnings profile of all workers in Norway increases, at a decreasing rate, with every year of experience. The return to working experience for immigrants is given by $\partial(\ln Yi)/\partial(T_i) + \partial(\ln Yi)/\partial(Idummy*T_i)$. This marginal return to years of experience is higher for natives than immigrants in the beginning, but it increases at a lower rate for natives. According to the regression equation that I use, a measure of the experience effect is the value of $\partial(\ln Yi)/\partial(Idummy*T_i)$. Thus the estimate of the experience effect, suggested by the results in table 4, is $[\partial(\ln Yi)/\partial(Idummy*T_i)] = [-0{,}0116 + 0{,}0002*T]$.

However, the estimate of $\partial(\ln Yi)/\partial(Idummy*T_i)$ is biased downwards. Since the Norwegian data does not provide information about how long time an individual has spent as unemployed, T is not a good proxy for working experience[4], in particular because local unemployment affects immigrants more than natives (Bratsberg et al. (2006)). Both $\partial(\ln Yi)/\partial(T_i)$ and $\partial(\ln Yi)/\partial(Idummy*T_i)$ are biased downwards because they would evaluate the true return if individuals had been employed all the time since education was finished. But they do not measure the true return to experience because years of unemployment are not excluded form T. Given that unemployment effects immigrants more severely, $\partial(\ln Yi)/\partial(Idummy*T_i)$ is biased even more downwards. Since this makes the difference between natives and immigrants' return to years of experience larger than what it really is, the experience effect is overestimated in this analysis.

Beyond the effect of the working experience, the estimates of the coefficients of YSM and YSMsq suggest that the profile of immigrants increase at an increasing rate with every year spend in Norway. Although these coefficients are very small, the coefficient of YSMsq in particular, it is somewhat surprising that they are both positive. However, too much importance should not be put on the coefficient estimates of YSM and YSMsq because

[3] Describing an Eastern European as a non English mother-tongue speaker is rather redundant, but this is only because of the choice of reference group. This apparent redundancy may be avoided without changing the core of the analysis, if Western Europe is chosen as the reference group instead. Then, the reference group would be Western Europeans who do not have English as first language.

[4] This observation is owed to a presentation by Taryn Ann Galloway, in "Econometrics seminars spring 2007" organized by University of Oslo.

we know, from part 3**,** that they are biased estimates. What follows in the next section is a more careful consideration of the *years effect* and the *cohort bias.*

5.2 Estimates of cohort based model

In order to distinguish between the *cohort bias* and the *years effect*, I run a regression with the same variables as above and I include cohort variables in addition[5].

Table 5. OLS coefficient estimates of the cohort based model

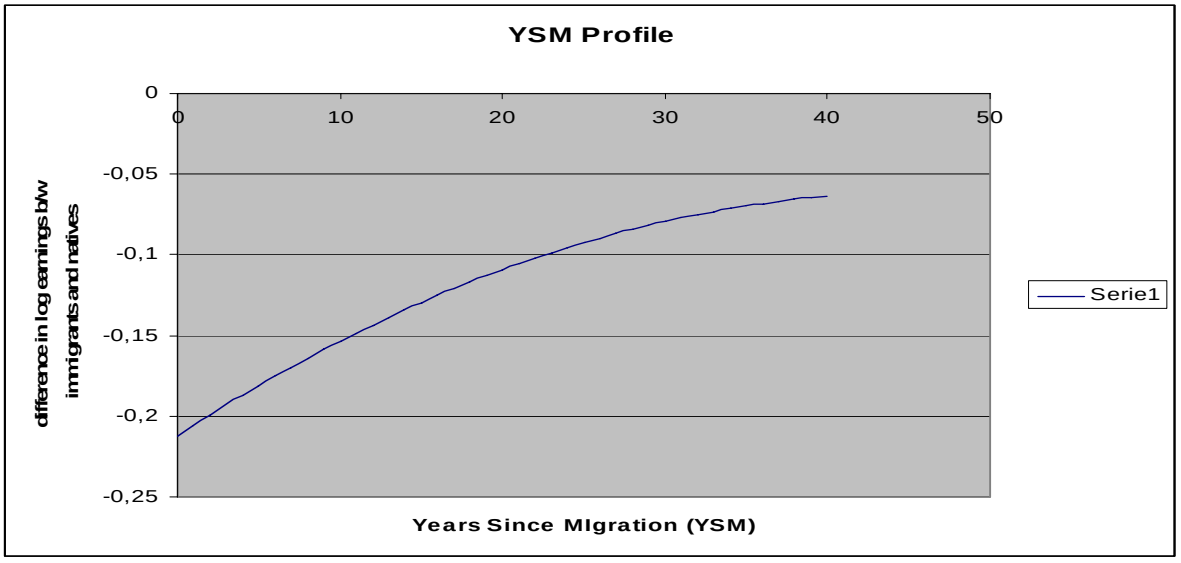
Variables	Coef.	Std. Err.	Pvalue
Idummy	-0,1463	0,0219	0,000
YSM	0,0066	0,0009	0,000
YSMsq	-0,0001	0,0000	0,000
T	0,0278	0,0004	0,000
Tsq	-0,0005	0,0000	0,000
Edu_years	0,0517	0,0004	0,000
Edu_years_miss	0,0603	0,0027	0,000
Coh6569	-0,0045	0,0080	0,570
Coh7074	-0,0155	0,0092	0,090
Coh7579	-0,0071	0,0108	0,512
Coh8084	-0,0017	0,0126	0,895
Coh8589	-0,0657	0,0145	0,000
Coh9094	-0,0218	0,0166	0,189
Coh9599	0,0087	0,0189	0,647
Coh0003	-0,0487	0,0209	0,020
obsyear1998	0,0704	0,0027	0,000
obsyear1999	0,0886	0,0027	0,000
obsyear2000	0,1190	0,0028	0,000
obsyear2001	0,1549	0,0027	0,000
obsyear2002	0,2088	0,0028	0,000
obsyear2003	0,2326	0,0029	0,000
Africa	-0,1163	0,0050	0,000
Asia	-0,0827	0,0039	0,000
North & Central America	0,1890	0,0068	0,000
South America	-0,0585	0,0067	0,000
Australia & Oceania	0,1909	0,0165	0,000
Western Europe	0,2509	0,0037	0,000
English	0,0658	0,0044	0,000
TxIdummy	-0,0106	0,0006	0,000
TsqxIdummy	0,0002	0,0000	0,000
Edu_yearsxIdummy	-0,0102	0,0006	0,000
Edu_years_missxIdummy	0,0148	0,0048	0,002
Constant	9,3948	0,0048	0,000
Nr. of observations	579557		
R squared	0,1405		

Immigrants are divided into cohorts according to the year when they came to Norway. There are 9 cohorts in total and a dummy variable for each cohort is constructed. The pre-1965 arrivals are grouped in a single cohort, the first one. While the last cohort ranges from 2000 to 2003. The remaining 7 cohorts are built for every 5 years, from 1965 to 1999. Of these 9

[5] A discussion on longitudinal and quasi longitudinal data takes place in part 4.

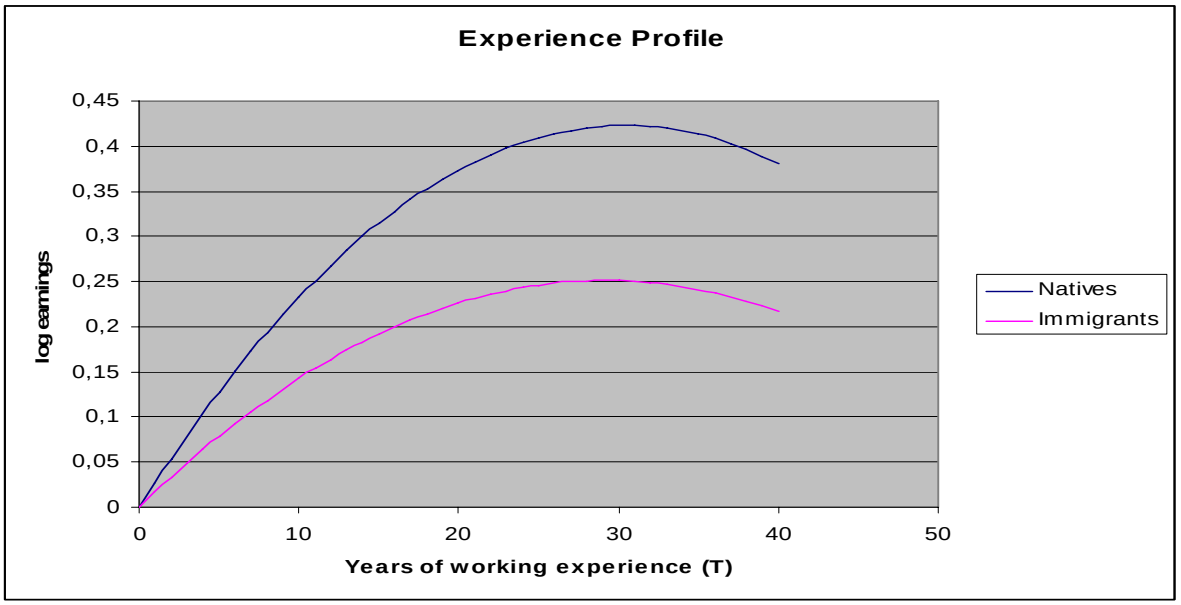
dummies, the one that represents the 1936-1964 cohort is left out of the regression and consequently is the reference point for the other cohorts. Table 5 summarizes the results of the regression. The YSM effect and the experience effect, based on the estimates in table 5, are shown in figures 2 and 3.

Figure 2



The difference in log points of earnings between immigrants and natives under the YSM effect. The 1985 to 1989 cohort is shown in the figure. The estimates used in the graph are taken from table 5.

Figure 3



Log of earnings of immigrants and natives as a function of years of working experience. The estimates used in the graph are taken from table 5.

There are four main differences between the results from the two regressions. First, the entry gap between immigrants and natives is lower when immigrant cohorts are controlled for (|-0,1463| < |-0,1489|). Second, the coefficient of YSM is higher (0,0066 > 0,0052). Third, the YSMsq variable has a significant negative estimated coefficient. Fourth

the experience effect (i.e. $\partial(\ln Yi)/\partial(Idummy^{*}T_i)$) is slightly different (from -0,0116+0,0002*T to -0,0106+0,0002*T).

In order to understand the new value of the entry gap we need to keep in mind that the immigrant dummy compares a hypothetical immigrant with a native as described in the previous section. In this new regression, in addition to the four types of the dummy variables included previously, there is the set of cohort dummies too. Thus the new immigrant benchmark, in addition to having the characteristics described earlier, is also a representative of the immigrants that came to Norway in the first cohort (i.e. 1936 to 1964).

Perhaps the most interesting of these differences is the second one. A higher coefficient of YSM suggests that the cohort bias is negative. A negative cohort bias may occur if the quality of recent cohorts is higher than that of earlier cohorts. By the term cohort quality, it is not meant intrinsic quality of cohorts, but rather how much productive use the human capital of particular cohorts find in the Norwegian labour market. So if later immigrant cohorts, with immigrants who have relatively small YSM values, are of better quality than earlier cohorts, than the cross section analysis underestimates the effect of years since migration. The performance of those who have been longer in Norway is not particularly better compared to those who have been for a shorter time in the country due to intrinsic differences between cohorts (i.e. the later ones are of a better quality). But since the cross section model can not identify such cross cohort differences, it evaluates economic performance on the basis of YSM and it suggests that years since immigration to Norway are less essential than what they really are.

If the entry earnings of each cohort are considered as an indication of cohort quality, the coefficients of the cohort dummies will imply how the quality of each cohort compares to the reference one. However the pattern suggested by these cohort quality estimates in table 5 is somewhat unclear. Furthermore most of these estimates tend to be insignificant, suggesting that there are no significant differences between the 1936-1964 cohort and the successive ones, in terms of human capital quality.

On the other hand the lower estimate of the YSM coefficient suggests a negative cohort bias, and this raises scepticism towards the results presented here, since the opposite is a more common finding in the existing academic literature. Positive cohort bias is well documented in USA (e.g. Borjas (1985, 1999)), Canada (e.g. Bloom and Gunderson (1991), Baker and Benjamin (1994)) and for immigrants from Africa, Asia and Latin America in Norway (e.g. Barth et al. (2004)).

However, in the Norwegian case the cohort pattern depends on whether area of origin of immigrants is controlled for or not. To show this I run the two regressions without the area of origin dummy variables. I also drop the variable YSMsq (the square of years since migration) since it is very small compared to the coefficient of YSM, suggesting that earnings depend almost linearly on YSM. The estimates of the coefficients of interest are shown in table 6. The coefficients of the cohort variables are significant at the 5% level. Although there is not a regular cross cohort pattern, the coefficient estimates tend to be more negative for later cohorts indicating that later cohorts have lower quality. This suggests a positive cohort bias, which is further supported by the YSM estimates. The cohort biased estimate of the coefficient of YSM is higher than the unbiased estimate (0,0066 > 0,0030).

Table 6 Regressions without controlling for area of origin

	Cross section model		With cohort specifications	
Variables	Coefficient	P value	Coefficient	P value
Idummy	-0,1290	0,0074	0,0007	0,0217
YSM	0,0066	0,0001	0,0030	0,0005
T	0,0278	0,0004	0,0278	0,0004
Tsq	-0,0005	0,0000	-0,0005	0,0000
coh6569			0,0142	0,0075
coh7074			-0,0427	0,0084
coh7579			-0,0756	0,0101
coh8084			-0,1060	0,0122
coh8589			-0,2330	0,0144
coh9094			-0,1542	0,0168
coh9599			-0,0639	0,0191
coh0003			-0,1597	0,0209
TxIdummy	-0,0143	0,0006	-0,0096	0,0006
TsqxIdummy	0,0003	0,0000	0,0002	0,0000

The OLS models used for these estimates, are similar to the models displayed in tables 3 and 4, except for area of origin variables and YSMsq being excluded.

Thus, an important conclusion from this section is that the cohort bias is sensitive to specifications of area of origin in the Norwegian data. When variables of area of origin are excluded from the regression equation, the cohort variables are more reflective of cross cohort patterns related to geographic composition. In this case, the coefficient of a cohort variable reflects the (relative) entry effect, of that particular cohort, which is due to the geographic composition and other possible factors. When area of origin is controlled for, the geographic composition of each cohort is not allowed to vary anymore. With respect to the first question raised in the introduction, this suggests that the geographic composition of the cohorts plays an important role in economic assimilation differences among cohorts of immigration.

5.3 Comparison between Norway and Canada

I have chosen to compare the findings presented here with the findings of Green and Worswick (2004) on immigrants' earning profiles in Canada. The results of a regression from the Canadian article and the results of a comparable regression on Norwegian data are shown below, in table 7. Notice that cohort arrival, education and observation year are controlled for, in the Canadian analysis but area of origin of immigrants is not. Consequently, I consider a regression without the area of origin specifications.

Table 7

Results from Norwegian data					Results form Canadian data	
Variables	Coef,	Std, Err,	P value		Variables	Coef
Idummy	0,0079	0,0221	0,720		Immigrant dummy	-0,22 (0,19)*
YSM	0,0017	0,0009	0,051		YSE	0,65 (0,0040)*
YSMsq	2,72E-05	1,54E-05	0,077		YSE Squared	-3,9E-3 (2,4E-4)*
T	0,0278	0,0004	0,000		1983-86 cohort	-0,18 (0,0087)*
Tsq	-0,0005	7,55E-06	0,000		1987-89 cohort	-0,16 (0,12)*
edu_years	0,0517	0,0004	0,000		1990-92 cohort	-0,35 (0,16)*
edu_years_miss	0,0602	0,0028	0,000		1993-96 cohort	-0,41 (0,23)*
coh6569	0,0197	0,0081	0,015		Other Controls	
coh7074	-0,0355	0,0093	0,000		High school education	-0,23 (0,0065)*
coh7579	-0,0680	0,0110	0,000		University education	,26 (0,0082)*
coh8084	-0,0994	0,0128	0,000		Experience	0,034 (0,0015)*
coh8589	-0,2288	0,0146	0,000		Experience Squared	-5,7E-4(3,2E-5)*
coh9094	-0,1535	0,0168	0,000		Year Dummies	
coh9599	-0,0677	0,0192	0,000		1982	-0,077 (0,026)*
coh0003	-0,1662	0,0212	0,000		1984	-0,13 (0,24)*
obsyear1998	0,0686	0,0028	0,000		1985	-0,11 (0,024)*
obsyear1999	0,0867	0,0028	0,000		1986	-0,12 (0,024)*
obsyear2000	0,1154	0,0028	0,000		1987	-0,11 (0,024)*
obsyear2001	0,1480	0,0028	0,000		1988	-0,078 (0,024)*
obsyear2002	0,2036	0,0028	0,000		1989	-0,082 (0,024)*
obsyear2003	0,2271	0,0029	0,000		1990	-0,11 (0,024)*
TxIdummy	-0,0095	0,0006	0,000		1991	-0,18 (0,024)*
TsqxIdummy	1,84E-04	1,34E-05	0,000		1992	-0,22 (0,023)*
edu_yearsxIdummy	-0,0005	0,0006	0,421		1993	-0,24 (0,024)*
edu_years_missxIdummy	0,0468	0,0049	0,000		1994	-0,22 (0,023)*
constant	9,3983	0,0048	0,000		1995	-0,20 (0,024)*
Nr. of observations	579557				1996	-0,20 (0,024)*
R squared	0,1135				1997	-0,16 (0,024)*
					Constant	10,23 (0,027)*
					# Observations	2442
					R Squared	0,85

Source of the Canadian results: Green and Worswick (2004) page 42-43.
Significance at 5% level is denoted by *

However the two regression equations are not identical. The set of independent variables that I use is different from the one in the Canadian article with the respect to the control variable for education and interaction variables. Green and Worswick (2004) use

dummy variables to control for education in their regression. The education level is divided in three groups, high school graduates, post secondary educated without university, university graduates. Instead, I use a single variable that describes the number of years of education beyond the compulsory level in Norway. In addition I have a dummy variable to identify those individuals whose information on education level is missing (although they are assigned zero in the previous variable). Furthermore I include interaction variables between the immigrant dummy variable and four variables (namely edu_years, edu_years_miss, T, Tsq). These interactions are not included in the other regression and this makes the other regression more restrictive. Without these interaction variables, two consequences arise. First, it is assumed that the return to education is the same for immigrants and natives in the host country's labour market. And second, the years effect are estimated without distinguishing between the YSM effect and the experience effect.

With regards to the Canadian results, considering the estimates of YSE (Years Since Entry in Canada) coefficients as the YSM effect leads to a biased estimate of the YSM effect because the coefficients of the YSE variables measure a mixture of the YSM effect and the experience effect. Unfortunately, whether the experience effect points in the same or opposite direction as the YSM effect is not investigated in the Canadian analysis. When the regression equation, which is used on Canadian data, is utilized on Norwegian data the YSM profile does not enter that regression significantly and $\partial(\ln Yi)/\partial(YSM_i)$ is estimated to be negative for the first 8,5 year (these estimation results are not shown here). This means that the experience effect overwhelms the YSM effect in the first 8,5 years of immigration to Norway.

On one hand, a legitimate question is whether using different independent variables compromises the comparison of the two regressions. On the other hand, using the same independent variables, utilized by Green and Worswick (2004), solely for the purpose of comparison is too restrictive. After all the aim is not to compare how a particular regression model explains immigrant assimilation rates in Canada and Norway but rather to compare the immigrant assimilation rates, in particular the accumulation rates of country specific human capital. Ultimately, how different the sets of independent variables can be and still allow for a satisfactory comparison is subjective. And since the Canadian data set is considerably different from the Norwegian one, some freedom over which variables to include in the regression model (relevant for the Norwegian case) is needed.

The yearly trends give an indication of the macro effect in the two economies, during the time interval when the data was collected. In both regressions (i.e. for Canada and

Norway), it is assumed that economic conditions affect natives and immigrants similarly. Yet the yearly trends of the two regressions are not directly comparable. For the Canadian case these coefficients reflect the trend of the average real earnings of all individuals in the survey, and this is a decreasing trend. In the analysis of the Norwegian data, the increasing trend describes the time pattern of the average nominal earnings.

Table 8. Cohort coefficients for immigrants to Canada and Norway

Norway		Canada	
cohorts	Entry effect	cohorts	Entry effect
Coh3664	0,0079		
Coh6569	0,0276		
Coh7074	-0,0276		
Coh7579	-0,0601*		
Coh8084	-0,0915*	coh8082	-0,22*
Coh8589	-0,2209*	coh8386	-0,40*
Coh9094	-0,1456*	coh8789	-0,38*
Coh9599	-0,0598*	coh9092	-0,57*
Coh0003	-0,1583*	coh9396	-0,63*

Significance at the 5% level is denoted by *.
Norwegian coefficients are calculated form the estimates in table 7.
Green and Worswick (2004) is the source of the Canadian estimates.

Table 8 represents the entry effect that is specific to each cohort. This is calculated by adding the coefficient of the immigrant dummy variable to the coefficient of each cohort. The result shows the earnings gap (i.e. the difference between earnings of immigrants and earnings of natives) at entry, for each cohort. First notice that the Canadian cohorts are from 1980 to 1996 and they are in average 3 to 4 years long. The Norwegian cohorts span from 1936 to 2003 and except from the first and the last cohort, they are 5 years long. Second, a decreasing cross cohort pattern is recognizable in Canada's case. The same can be said for Norway from 1965 to 1989, but not for all the years under consideration. Although later cohorts to Norway tend to have stronger entry effects, the overall pattern is not as distinguishable as in Canada. And third, the entry effects in Canada tend to be larger in absolute value than in Norway. Indeed the smallest entry wage gap for Canada, found in cohort 1980-1982, is comparable to the largest entry wage gap for Norway, found in cohort 1985-1989.

Now consider the YSM effect. It is worth remembering that the YSE coefficients in the Canadian results give the years effect. They can be considered as a measure of the YSM effect if we assume that the experience effect is zero. In turn, this assumption leads to a biased estimate of the YSM effect in the Canadian case. The Canadian estimates suggest that the YSE profile of immigrants increases at a decreasing rate, in Canada. Whereas the Norwegian estimates imply that the YSM profile of immigrants in Norway increases at an

increasing rate. However, the coefficients of the Norwegian estimates are very small. In particular the estimate of YSMsq is so small (0,000027) that for the first few years of immigration to Norway the log of earnings' profile (with respect to YSM) is almost linear. Even though the log of earnings profile becomes steeper for larger values of YSM, these projections are very far out into the future and the accuracy of such projections is questionable, at best. Thus, these observations suggest that the YSM effect plays a more important role in the assimilation process of immigrants to Canada than in the assimilation process of immigrants to Norway.

Green and Worswick (2004) pay particular attention to shifts in area of origin across immigrant cohorts. From the earlier discussion on cohort bias, area of origin appears to be important in the Norwegian case too. In the next section I consider shifts in area of origin more carefully, by separating university graduates from the rest of immigrants to Norway. In addition I compare the implications that education and different geographic sources of immigration have on the assimilation of immigrants to Norway and Canada.

5.4 Controlling for education and area of origin

In the analysis of area of origin shifts, Green and Worswick (2004) use a regression model that is different from the one that I was earlier referring to. Instead they use an equivalent model to running separate regressions for natives and immigrants. Without going into detailed description of their new regression model, the main differences occur along two venues.

First, the native control group does not consist of individuals who have comparable age with immigrants. Instead the selected natives are such that they enter the Canadian labour market for the first time when immigrants enter Canada. These natives are in average 25 years old, and they are used as a control group for all group-ages of immigrants. This is done because, according to the authors, newly arrived immigrants are essentially new entrants in the Canadian labour market. In this respect, the most similar group of native Canadian labour force consists of native new entrants. They are similar because they lack Canadian firm specific human capital. Also newly arrived immigrants are more vulnerable to labour market conditions, just like Canadian new entrants are more vulnerable than Canadians with tenure. As a result, newly arrived immigrants are more likely to choose investment paths in human capital that are similar to native new entrants. In order to control for labour market conditions, natives are also organized in cohorts of entry in the labour market.

Second, immigrants are divided into 24 groups according to age at arrival, area of origin and education. There are 4 group ages at arrival, 25 to 29, 30 to 34, 35 to 39 and 40 to 44 years old. The areas of origin are three, English speaking countries, Western European countries (where English is not a native language), and the rest of the world. Immigrants are also divided into two groups according to education (high school graduates, and university graduates). Grouping immigrants according to these three characteristics, results in 24 groups of immigrants that differ by age at arrival *and* origin *and* education. The regression equation for each group of immigrants is

$$\text{Ln } Y_{i,I} = C_{0,I} + C_{1,I}\text{Fyear}_i + \sum_j \kappa_{j,I}(\text{coh}_j) + C_{2,I}\text{YSE}_i + C_{3,I}\text{YSE}_i^2 + \sum_j \alpha_{j,I}(\text{coh}_j * \text{YSE}_i) + \\ + \sum_j \beta_{j,I}(\text{coh}_j * \text{Fyear}_i) + C_{4,I}\text{Unempl.} + U_i \qquad (*)$$

From left to right, the variables represent the logarithm of earnings, a constant, a dummy identifying whether the year of data collection is the first year of arrival (Fyear_i), a set a of cohort dummies (coh_j), years since entry in Canada (YSE_i), the square of YSE, interaction terms between cohort dummies and YSE, interaction terms between cohort dummies and Fyear, detrended unemployment rate (Unempl).

Natives are divided in high school graduates (or lower), and university graduates. The regression equation that describes each of these two groups is

$$\text{Ln } Y_{i,N} = C_{0,N} + \sum_j \kappa_{j,N}(\text{coh}_j) + C_{2,N}\text{YSE}_i + C_{3,N}\text{YSE}_i^2 + \sum_j \alpha_{j,N}(\text{coh}_j * \text{YSE}) + C_{4,N}\text{Unempl.} + \\ + U_i \qquad (**)$$

From left to right, variables represent the logarithm of earnings, a constant, a set a of cohort dummies, years since entry in the Canadian labour market, the square of YSE, interaction terms between cohort dummies and YSE, detrended unemployment rate. The actual form of the regressions used in the Canadian article is shown in part C of the Appendix.

The years effect are still not separated into YSM effect and experience effect. The years since migration effect may be considered equal to $[\partial(\text{Ln } Y_{i,I})/\partial(\text{YSE}_i) - \partial(\text{Ln } Y_{i,N})/\partial(\text{YSE}_i)]$ under the assumption that one year of experience in the Canadian labour market is the same for newly arrived immigrants and native new entrants (i.e. it is assumed that experience effect is equal to zero). Thus, $[\partial(\text{Ln } Y_{i,I})/\partial(\text{YSE}_i) - \partial(\text{Ln } Y_{i,N})/\partial(\text{YSE}_i)]$ really estimates the net result of the years since migration effect and the experience effect (i.e. the years effect).

However, if it is true that the experience effect is mainly due to firm specific human capital, assuming that it is equal to zero is not as restrictive as before because of the new control group. Since native new entrants and immigrants are similar in the level of (Canadian) firm specific human capital, the bias of the experience effect may be smaller

here. It may be smaller, but not zero because local unemployment may affect immigrants differently from native new entrants.

Green and Worswick (2004) pay attention to the entry effects, specific to each cohort, for each of the 24 immigrant groups. They do so by considering the first year after arrival variable (i.e. $Fyear_i$). Next they calculate the present value of earnings in the host country (PVEH), as suggested by Mincer (1974). PVEH provides an alternative point of comparison, X_I years after entry in Canada for immigrants and X_N years after entry in labour force for natives. X_I is estimated to be between 6.5 and 7.8, depending on the group age, and X_N is estimated to be 8 years. The results of Green and Worswick (2004) are included in part B of the appendix.

5.4.1 Area of origin and education of immigrants in Norway

My approach to the Norwegian case is less detailed. Since dividing the immigrants into many groups did not allow for enough variation in each group, I separated them only according to education. Thus both immigrants and natives are divided into those with university education and those with lower than university education. Natives are not grouped in cohorts, and they are not necessarily new entrants in the Norwegian labour market. The regression results of each education group are shown in part A of the appendix. Interaction terms between area of origin and YSM are included, in order to allow for YSM profiles that are specific to area of origin. Also all English mother-tongue speakers are included in the English dummy, but they are excluded from their respective continents (i.e. Canadians and Americans are included in "English" but not in "North & Central America"). The reason for this change is to account for English speakers in the same manner that it is accounted for in the Canadian article.

Table 9

The origin specific coefficients of the YSM variable

	University educated	Without university education
Eastern Europe	0,0084*	0,0085*
Africa	0,0154*	0,0148*
Asia	0,0103*	0,0121*
N_C_america	-0,0003	0,0004
S_america	0,0128*	0,0110*
aus_ocea	0,0008	0,0013
Westeu	-0,0002	0,0002
English	0,0073*	0,0074*

5% level of significance is denoted by *

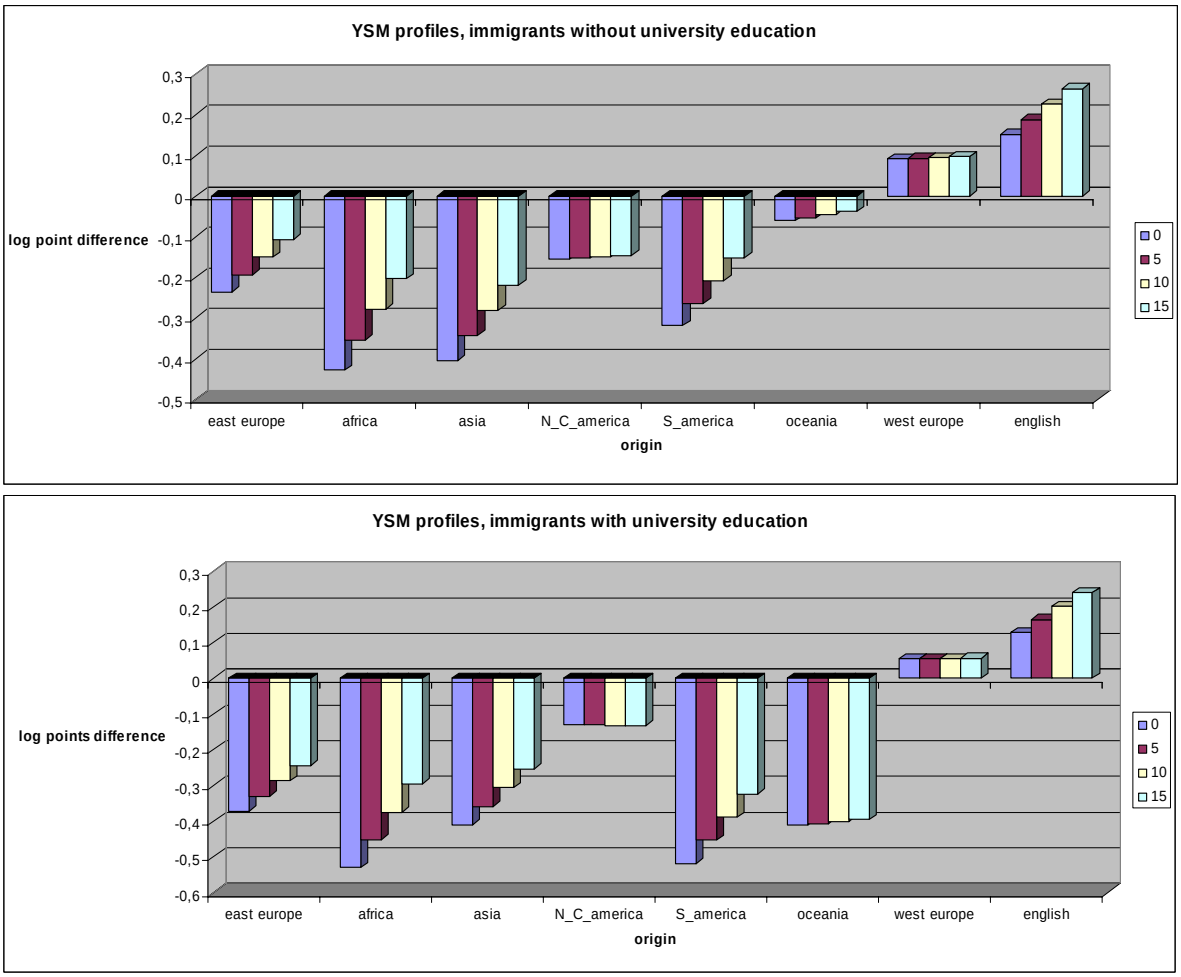
Coefficients are derived from the models represented in tables A1 and A2 in the appendix

Table 9 gives an indication of how the YSM effect compares among immigrants from different origins. The coefficient of the variable YSMsq is not shown here because interactions between this variable and area of origin are not included in the regression equations that I use. In other words, the coefficient of YSMsq is an average of all the origin specific coefficients and consequently does not serve the purpose of comparison. Immigrants from Africa have the highest rates of country specific human capital accumulation among immigrants with and without university education. The lowest coefficient estimates of YSM belong to North and Central American (without USA and Canada) immigrants among the university educated, and to Western European immigrants among those without university education. Immigrants with university education form North and Central America and Western Europe have puzzling negative estimates, but they are not significant. Related to a later discussion, it is interesting to notice that the coefficient estimates of YSM for university educated immigrants tend to be lower than the estimates of immigrants without university education. Only immigrants with university education from Africa and South America have YSM estimates that are larger than those of immigrants without university education form the same regions.

According to the regression equations used, a comparison of experience effects can be made only between immigrants with and without university education in Norway. Figure A1 and figure A2, in the appendix, show the experience profiles of each education groups. It is implicitly assumed in the figures that immigrants and natives with the same years of working experience are being compared. Notice that the negative gaps are larger for immigrants and natives with a university degree than for immigrants and natives without a university degree.

Figure 4 shows the YSM profiles of Norwegian immigrants. For each area of origin, the difference between immigrants' earnings and natives' earnings (only due to the YSM effect) is given at four values of YSM (0, 5, 10 and 15 years since migration). The bar for YSM=0 represents the entry effect that is specific to area of origin in cohort 1985 to 1989. This means that the length of each bar at YSM=0 is equal to the sum of the coefficients of Idummy and coh8589 and specific area of origin dummy variable. Immigrants without university education are given 1.5 years of education above the compulsory schooling in Norway, and university educated immigrants are given 7 years of education above the compulsory schooling, to account for the fact that the two groups have different lengths in years of education.

Fig. 4 YSM profiles for immigrants to Norway according to education and area of origin



Estimates used in this figure are taken form tables A1 and A2 in the appendix.

Of all areas of origin, Western Europeans (without English speakers) and all English mother-tongue speakers are the only ones that have positive entry earnings. In other words they do not experience any disadvantage from lack of country specific human capital, like the rest of immigrants to Norway.

5.4.2 Comparison between Norway and Canada

Figure 4 and the figures from Green and Worswick (2004) can be used for comparing the entry effects only to a limited extent. The figures of the Canadian study show the immigrant's log earnings in the first year after entrance. In order to have an estimate of entry effect according to the definition used so far, the coefficient of the immigration dummy is also needed. Unfortunately, the estimate of the immigrant dummy's coefficient is not given in the Canadian study in this particular part of the empirical analysis. Since only first year after arrival is given, the comparison is limited in the sense that comparison of magnitudes

may be inappropriate. However the comparison of cross origin patterns is still acceptable in my opinion.

In order to compare the YSM profiles (always remembering that the Canadian estimates give a biased estimate of the YSM effect), however, the tables on differences in present value of earnings (also included in the appendix) are needed too. The results on the Canadian case and figure 4 are not directly comparable because figure 4 does not specify age groups and cohorts. However, it is important to know that the results displayed in figure 4 are weighted averages of all the ages of immigrants. In addition, for the purpose of comparison, cohort 1987-1989 in the Canadian case may be considered more carefully than other cohorts, since it is the most synchronous with the cohort employed in figure 4 (i.e. cohort 1985 to 1989).

The Canadian results and the Norwegian results are similar in the cross origin pattern of entry earnings. Immigrants from North Western Europe appear to have higher entry earnings in the 1987-89 cohort (except for the age group 25-29, with high school education). And the same is found for immigrants from Western Europe with and without university education, in the Norwegian data. Moreover, in both groups of education, the results found for North-Western Europeans in Canada are even stronger for English speakers, just like the results found for Western Europeans are even stronger for English speaking immigrants in Norway. Whether with a university education or not, immigrants from the rest of the world have a negative entry effect both in Norway and Canada.

A striking difference between the two countries is that most university educated immigrants in Norway have larger negative differences in earnings or smaller positive differences (depending on area of origin) than immigrants without a university education. Immigrants from North and Central America, who are not English mother-tongue speakers, are the only exception. In contrast, immigrants with higher education in Canada have more beneficial entry effects.

Referring to the Canadian results, immigrants from North Western Europe and from English speaking countries, with a university degree, have larger positive differences in entry earnings than those without a university degree. While immigrants from the rest of the world, with a university degree, have negative entry gaps with smaller absolute values than those without a university degree. Thus immigrants with a university degree in Canada have more advantages at entry than immigrants without university education. On the contrary, figure 4 shows that most of immigrants without university education have more advantages than immigrants with university education in Norway.

Table 10

differences in PVEH for cohort 1987-89

university graduates

Arrival age	Other	North West Europe	English
25-29	-0,092(0,042)*	0,26 (0,044)*	0,23 (0,049)*
30-34	-0,11 (0,045)*	0,27 (0,050)*	0,38 (0,039)*
35-39	-0,17 (0,043)*	0,20 (0,043)*	0,29 (0,042)*
40-45	-0,34 (0,045)*	0,12 (0,041)*	0,51 (0,052)*

high school graduates

Arrival age	Other	North West Europe	English
25-29	-0,14 (0,25)*	-0,094 (0,031)*	0,10 (0,043)*
30-34	-0,14 (0,26)*	-0,11 (0,12)*	0,28 (0,042)*
35-39	-0,14 (0,41)*	-0,12 (0,17)*	0,13 (0,033)*
40-45	-0,25 (0,29)*	0,044 (0,28)+	0,18 (0,066)*

* significant at 5% level, + significant at 10%, standard error in parathesis
source: Green and Worswick (2004), page 49. 50

Table 10 shows the PVEH difference between immigrants (of cohort 1987 to 1989) and natives in Canada. Except for university graduates, from the category Other (i.e. other than North Western Europe and English speaking countries), of ages 35 to 39 and 40 to 45, all university graduated immigrants have more advantageous PVEH differences than immigrants without a university education. For the Norwegian case, figure 4 shows that most of immigrants without university education have more advantageous differences, when compared to immigrants with a higher education also after 5, 10 and 15 years after entry in Norway. This should not come as a surprise because table 9 shows that the return to years since migration tends to be lower for immigrants with higher education than for immigrants without higher education. Even higher educated immigrants form North and Central America who benefit from a better entry effect (compared to immigrants from North and Central America with lower education), have a negative estimate of the YSM coefficient.

Furthermore the experience effect was earlier found to be more severe for higher educated immigrants than for those without a higher education in Norway. Thus if we were to add the experience effect to the YSM effect (which would give a more comparable measure to the estimates from the Canadian article) most of the entry effect differences between low and high educated immigrants would become even stronger with time. A somewhat surprising conclusion from this comparison is that, unlike the case in Canada, immigrants without higher education are in a leading position when compared to immigrants with a higher education in terms of economic assimilation in Norway.

It is important to note that being in a leading position does not refer to absolute earning levels and it does not mean that immigrants with higher education earn less than

immigrants without higher education. If that were the case, the return to education would have been negative. And all the estimation equations, which have been shown here, suggest a positive return to education for immigrants. Although return to education is lower for immigrants than for natives, [∂(lnYi)/∂(edu_years) + ∂(lnYi)/∂(edu_yearsxIdummy)] is still positive.

Since low and high educated immigrants are compared with their native counterparts, being in a leading position refers to the similarity between low educated immigrants and low educated natives as opposed to the similarity between high educated immigrants and high educated natives. Regarding non-English speaking and non-Western European areas of origin, although most of high educated immigrants accumulate country specific human capital as reflected by their earnings' profiles (except for North and Central American immigrants who have a negative estimate of YSM), they are the groups that are the most different from their native counterparts. In terms of country specific human capital as evaluated by the Norwegian labour market, the results found here suggest that immigrants and natives with low education are more alike than immigrants and natives with high education. This raises concerns about the accumulation of country specific human capital by immigrants with university education, in particular for those who do not have English as first language or who do not come from Western Europe.

6. Conclusion

The aim of this thesis is to compare the economic assimilation of immigrants in Canada and Norway, given that these two countries have different immigration policies. Specifically there were three questions raised in order to narrow the scope of this study. The first question asked about the role of immigrants' area of origin on their economic assimilation in Norway. The second one inquired on how immigrants' entry earnings and their accumulation of country specific human capital compared in Norway and Canada. The third question aimed at identifying differences in economic assimilation of immigrants in Norway and Canada when area of origin and education is controlled for.

The findings suggest that the assimilation of immigrants in Norway varies with their geographic source. Estimates of the cohort effect are indeed very sensitive to specifications of area of origin. The accumulation of country specific human capital appears to happen at a higher rate in Canada than in Norway. However, the entry effect is more severe for immigrants in Canada than in Norway.

The cross origin pattern of immigrants' entry earnings is similar in Norway and Canada. More clearly, English mother-tongue speakers and North Western Europeans have positive entry earnings in Canada and in Norway. Immigrants from the rest of the world, instead, have negative entry earnings.

When immigrants and natives are separated according to education, the results for Norway are different from those for Canada. Most of immigrants in Norway with a university degree have larger negative entry effect (or smaller positive entry effect, depending on area of origin) than immigrants without a university degree. The country specific human capital accumulation rates tend to be higher for immigrants without university education. Furthermore the experience effect penalizes immigrants with university education more than immigrants without university education. In contrast, immigrants with higher education have more advantageous entry effect and years effect in Canada.

It should be kept in mind that the immigrants' return to education is positive in Canada as in Norway. Thus in absolute terms, immigrants with higher education are likely to have higher earnings in both countries. But (in terms of earnings) immigrants with higher education in Norway appear to be less alike Norwegian natives with higher education, than immigrants with lower education are alike Norwegian natives with lower education. On the contrary the opposite is true in Canada.

An important observation about the Canadian study is that the years effect are considered without separating between the YSM effect from the experience effect. The findings on the Norwegian data suggest the YSM effect closes the wage gap between immigrants and natives, whereas the experience effect tends to open it. In particular the experience effect makes the wage difference between immigrants and natives with higher education larger than the wage difference between immigrants and natives with lower education.

It would have been interesting to know the sign of the experience effect for immigrants in Canada, and to know whether it changes by education level. Ultimately, it would have been most interesting to allow for the experience effect to vary by area of origin of immigrants (i.e. experience effect that is specific to area of origin) in Norway and in Canada. This may be the aim of future studies since, at least regarding the Norwegian data used in this study, such detailed specifications did not allow for enough variations in the data subsets.

Concerning the differences in Canada and Norway on the assimilations of immigrants with different education level, immigration policy may offer some explanation. The "point system" in Canada shows that immigrants with higher education are preferred, in addition to certain skills being preferred to others, so as to respond to perceived domestic market needs. Thus immigrants with higher education that are accepted in Canada are likely to economically assimilate faster than immigrants without higher education. The same can not be said about Norway because the education composition of immigrants in Norway is more random than in Canada and it is less likely to reflect domestic market needs. However immigration policy is probably far from sufficient in explaining this difference between Canada and Norway.

Regarding the importance of a selective immigration policy, finding that the YSM effect is larger in Canada than in Norway suggests that immigrants in Canada accumulate country specific human capital faster than immigrants in Norway. This does not contradict the suggestion that a selective immigration policy, as the "point system", provides immigrants that assimilate more easily. However a more detailed and explicit comparison of accumulation rates of firm specific human capital (i.e. experience effect) is needed to better assess the role of the immigration policy.

7. Summary

This thesis compares the immigrant economic assimilation rates in Norway and in Canada, in the light of different immigration policies in the two countries. Previous studies on the role that immigration policy has on economic assimilation of immigrants have highlighted the importance of skill and geographic compositions of immigrant cohorts and how it can be affected through policy tools. Borjas (1991) finds that immigration policy can be one reason why earnings of immigrants and natives in Canada are more similar than in USA. Green and Green (1996) discover that changes in Canadian immigration policy in 1960s account for shifting the immigrant composition from low skilled to high skilled in Canada. Constant and Zimmerman (2005) advocate the introduction of a selective immigration policy that addresses the demands of the labour market in EU.

With regards to immigration policies in Norway and Canada, they differ in terms of the absolute and relative size of economic immigrants. The Canadian immigration policy grants entry to a considerable number of economic immigrants every year. This is done through a selective process, where applicants are evaluated in terms of their English/French competency, education, profession, etc. According to Green and Green (1996) the goals of the Canadian immigration policy have been to foster economic and demographic growth in the country. The number of economic immigrants in Canada is larger than in Norway. Most importantly, the size of the economic immigrants in Canada is among the largest compared to other immigrant classes, such as family reunion and refugees.

Four effects are identified in the theory of economic assimilation of immigrants, namely entry effect, years effect, cohort effect and the period effect (e.g. Borjas (1999)). Entry effect describes the earnings wage gap between natives and immigrants at entry. The years effect describes the dynamics of this wage gap as immigrants live and work in the host country. The cohort effect identifies the differences in the assimilation processes among arrival cohorts of immigrants. These differences may arise if cohorts vary in foreign language competence, general human capital, etc, as evaluated by the host country's labour market. The period effect, instead, describes how macroeconomic conditions (i.e. business cycles, growth trends) in the host country affect immigrants differently from natives.

The years effect consists of the year since migration (YSM) effect and the experience effect. The first one portrays the consequences on immigrants' earnings of accumulating country specific human capital, such as learning the foreign language, knowledge about customs, building a social network etc. The experience effect, on the other hand, is the

difference (between immigrants and natives) in yearly returns of being in the host country's labour force and is related to accumulation of firm specific human capital.

The results on immigrants in Canada by Green and Worswick (2004) are compared with the estimation results on immigrants in Norway. The two sets of results are not directly comparable and two important differences need to be kept in mind. First, the Canadian results come from a data set that is more adequate to this kind of analysis. This is the case because the dataset on immigrants in Canada is more similar to longitudinal data than the dataset on immigrants in Norway.

Second, the years effect is estimated in the Canadian study without distinguishing between the YSM effect and the experience effect. The estimates of the years effect may be considered as estimates of YSM effect only under the assumption that the experience effect is equal to zero. This leads to a biased estimate of the YSM effect. The sign of this bias depends on the sign of the experience effect, which is unknown.

The assumption that experience effect is equal to zero, may lead to a smaller bias in the second part of the estimation analysis because the regression model from Green and Worswick (2004), which I use for comparison in the second half of the empirical analysis, uses a new group of native Canadians. This group of native Canadians consists of new labour market entrants, who have no firm specific human capital and thus are similar to immigrants (i.e. the size of the experience effect may be smaller in absolute value).

The cross origin pattern of entry earnings is the same in Norway and Canada. English mother tongue speakers have the highest positive entry effect in both countries. Immigrants from North-Western Europe (for Canada and from Western Europe in Norway) come second with a positive effect also. Immigrants from the rest of the world have negative entry effects instead.

The YSM effect appears to play a more important role in the economic assimilation of immigrants in Canada than immigrants in Norway. The experience effect for immigrants in Norway is found to be negative, in other words the experience effect makes the wages of immigrants lower than those of natives. Somewhat surprisingly, the experience effect is more severe for immigrants with university education than those without university education.

The Norwegian results are different from the Canadian ones when area of origin and education are both controlled for. Most university educated immigrants have less advantageous entry effects than immigrants without university education in Norway. Furthermore the years effect of university educated immigrants are smaller than the years

effect of immigrants without university education. The opposite is found in the Canadian study when immigrants with university education are compared to immigrants with high school education. These comparisons across education groups are not based on absolute sizes. Instead they compare how similar the education groups of immigrants are to their native counterparts.

The results found here do not contradict the suggestion that a selective immigration policy with economic criteria leads to immigrants who assimilate more easily in economic terms. However to better evaluate the role of immigration policy, a more considerate comparison of the experience effect is necessary.

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Appendix

A. Tables of estimates on the Norwegian data

Table A1 summarizes the regression of pooled immigrants and natives without university education. Table A2 instead shows the results of immigrants and natives with university education.

Table A1
Norwegian natives and immigrants without university education

Variables	Coef.	Std. Err.	P value
Idummy	-0,1430	0,0296	0,0000
YSM	0,0085	0,0012	0,0000
YSMsq	0,0000	0,0000	0,5320
T	0,0252	0,0005	0,0000
Tsq	-0,0004	0,0000	0,0000
utdaar	0,0489	0,0011	0,0000
coh6569	-0,0001	0,0102	0,9900
coh7074	-0,0284	0,0116	0,0150
coh7579	-0,0240	0,0139	0,0840
coh8084	-0,0036	0,0161	0,8250
coh8589	-0,0674	0,0186	0,0000
coh9094	-0,0271	0,0215	0,2060
coh9599	-0,0346	0,0248	0,1630
coh0003	-0,1393	0,0304	0,0000
obsyear1998	0,0659	0,0036	0,0000
obsyear1999	0,0924	0,0035	0,0000
obsyear2000	0,1122	0,0036	0,0000
obsyear2001	0,1508	0,0035	0,0000
obsyear2002	0,1965	0,0036	0,0000
obsyear2003	0,2260	0,0037	0,0000
africa	-0,1926	0,0118	0,0000
asia	-0,1684	0,0093	0,0000
N_C_america	0,0817	0,0223	0,0000
S_america	-0,0834	0,0178	0,0000
aus_ocea	0,1757	0,1228	0,1520
westeu	0,3264	0,0082	0,0000
english	0,3863	0,0124	0,0000
YSMxafrica	0,0064	0,0008	0,0000
YSMxasia	0,0037	0,0006	0,0000
YSMxN_C_am~a	-0,0081	0,0006	0,0000
YSMxS_amer~a	0,0025	0,0011	0,0210
YSMxaus_ocea	-0,0071	0,0011	0,0000
YSMxwesteu	-0,0082	0,0005	0,0000
YSMxenglish	-0,0011	0,0005	0,0220
TxIdummy	-0,0086	0,0009	0,0000
TsqxIdummy	0,0001	0,0000	0,0000
utdaarxIdu~y	-0,0170	0,0017	0,0000
_cons	9,4250	0,0069	0,0000
Nr. of observations	280650		
R squared	0,1101		

Table A2
Norwegian natives and immigrants with university education

Variables	Coef.	Std. Err.	P value
Idummy	-0,3462	0,0382	0,0000
YSM	0,0084	0,0016	0,0000
YSMsq	0,0000	0,0000	0,6290
T	0,0362	0,0006	0,0000
Tsq	-0,0007	0,0000	0,0000
utdaar	0,0285	0,0009	0,0000
coh6569	-0,0269	0,0120	0,0250
coh7074	-0,0628	0,0142	0,0000
coh7579	-0,0731	0,0170	0,0000
coh8084	-0,0851	0,0201	0,0000
coh8589	-0,1396	0,0232	0,0000
coh9094	-0,0850	0,0271	0,0020
coh9599	-0,0547	0,0312	0,0790
coh0003	-0,2330	0,0381	0,0000
obsyear1998	0,0698	0,0049	0,0000
obsyear1999	0,0840	0,0048	0,0000
obsyear2000	0,1378	0,0049	0,0000
obsyear2001	0,1784	0,0049	0,0000
obsyear2002	0,2323	0,0049	0,0000
obsyear2003	0,2502	0,0051	0,0000
africa	-0,1573	0,0154	0,0000
asia	-0,0372	0,0135	0,0060
N_C_america	0,2425	0,0289	0,0000
S_america	-0,1452	0,0227	0,0000
aus_ocea	-0,0376	0,2200	0,8640
westeu	0,4271	0,0112	0,0000
english	0,4997	0,0127	0,0000
YSMxafrica	0,0071	0,0009	0,0000
YSMxasia	0,0019	0,0008	0,0170
YSMxN_C_am~a	-0,0087	0,0007	0,0000
YSMxS_amer~a	0,0044	0,0014	0,0010
YSMxaus_ocea	-0,0076	0,0014	0,0000
YSMxwesteu	-0,0085	0,0007	0,0000
YSMxenglish	-0,0011	0,0004	0,0170
TxIdummy	-0,0141	0,0011	0,0000
TsqxIdummy	0,0002	0,0000	0,0000
utdaarxIdu~y	0,0162	0,0014	0,0000
_cons	9,5108	0,0096	0,0000
Nr. of observations	216870		
R squared	0,1146		

Fig A1 results from table A1 in the appendix

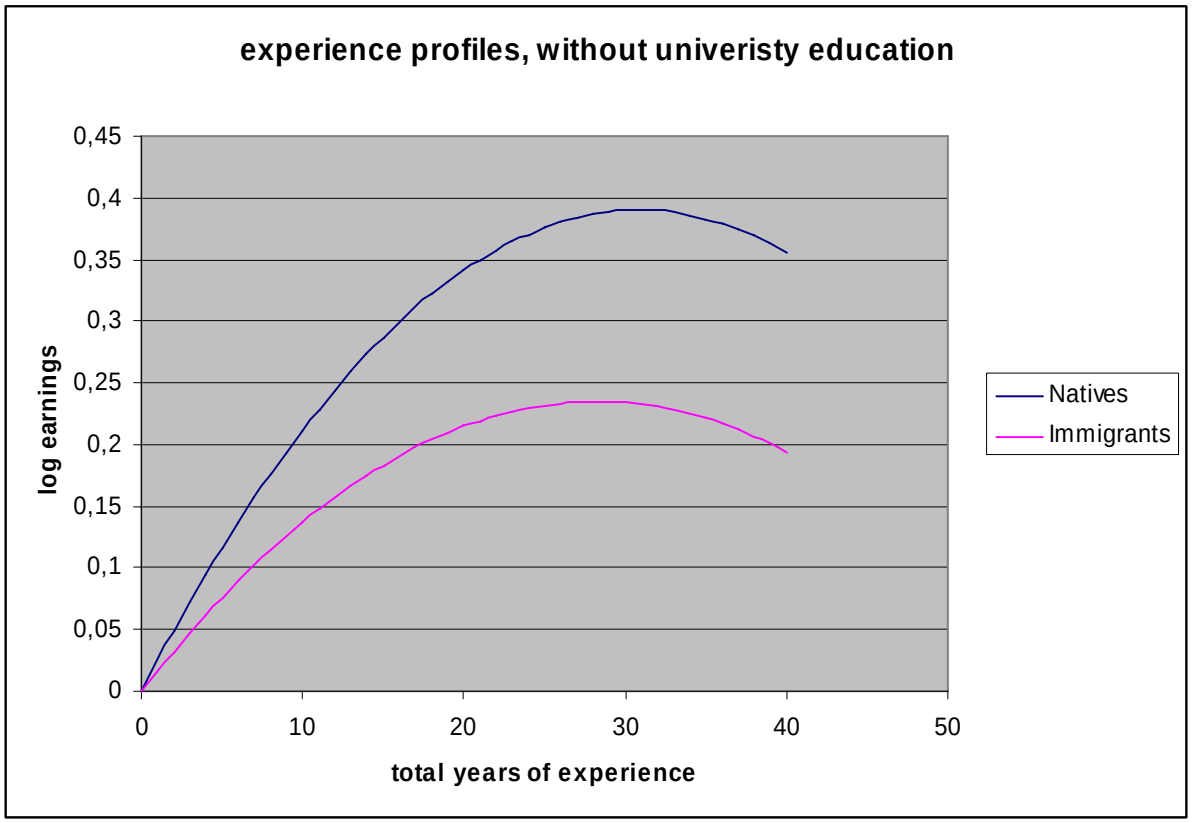
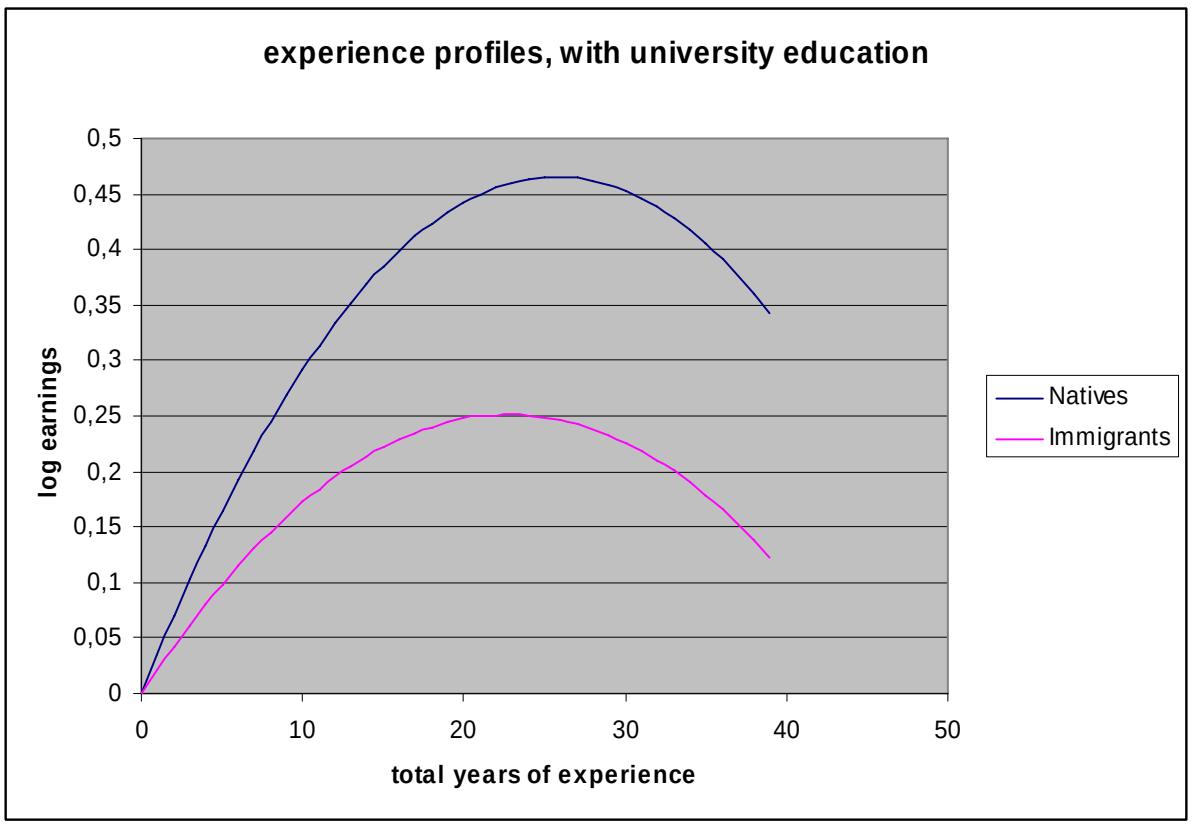


Fig A2 results form table A2 in the appendix



B. Graphs and Tables from Green and Worswick (2004)

The graphs and tables in this appendix are taken from Green and Worswick (2004). Figures B1, B2, B3 show estimates of log earnings differences between natives and immigrants on the first year after arrival. Tables B1, B2 show the estimated differences in Present Value of Earnings (PVEH) between the two groups. Immigrants are divided in categories of age, education, arrival cohort and area of origin. The reference group of Canadian natives consists of natives who enter the labour market for the first time the year that immigrant cohorts enter Canada. They are divided according to education.

Figure B1
Immigrant/Native-Born Log Earnings Differences In First Year after Arrival: English-Language Countries

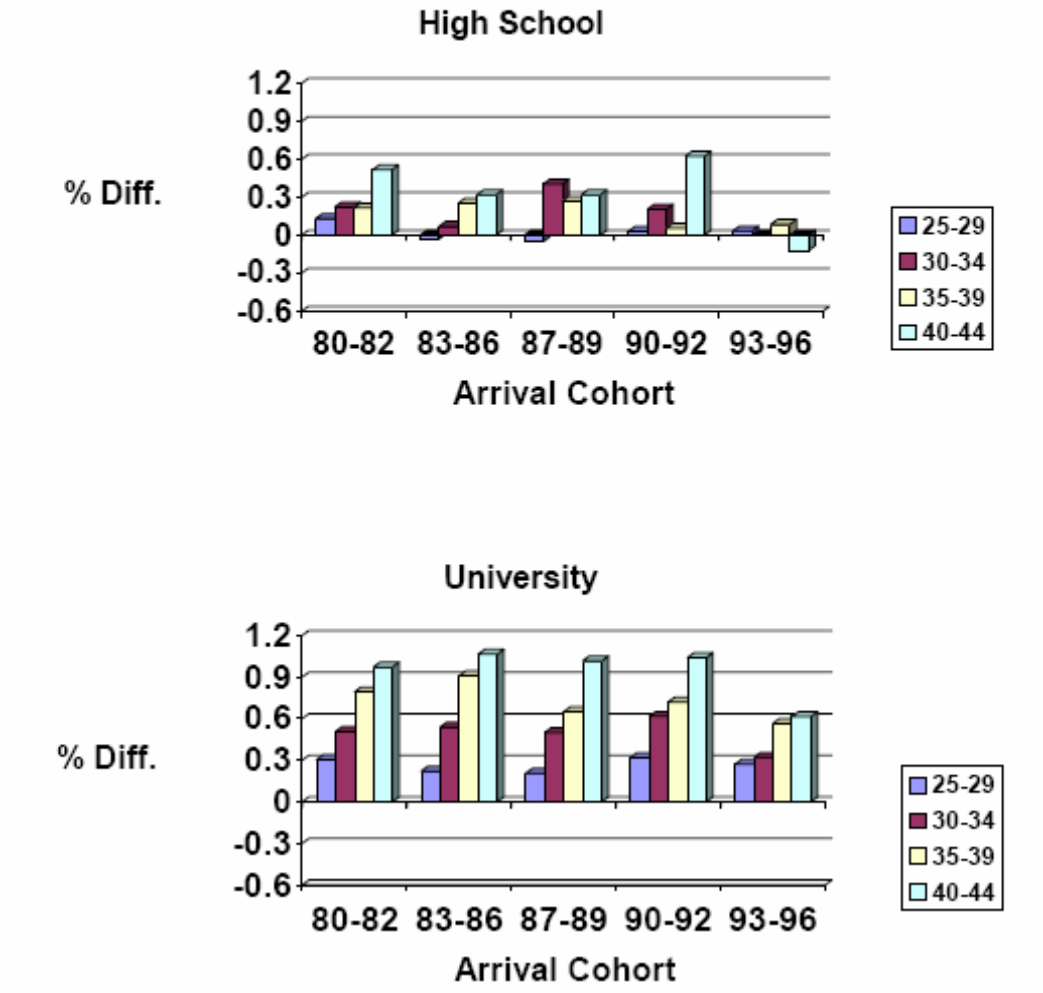
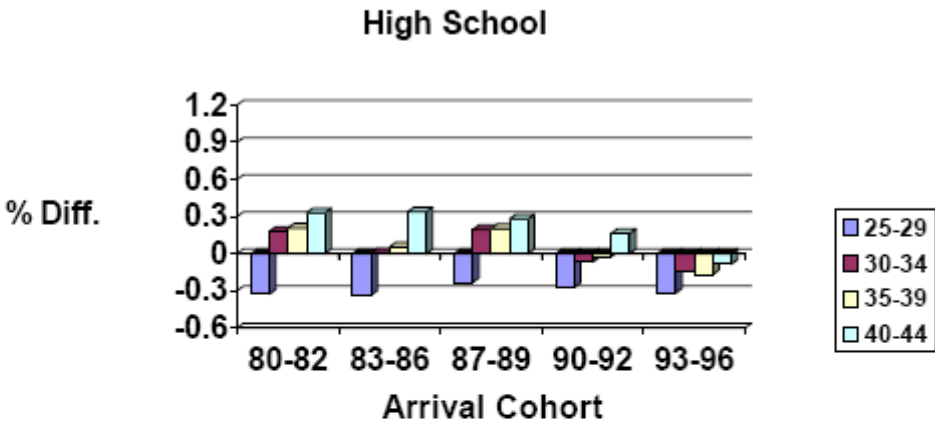


Figure B2
Immigrant/Native-Born Log Earnings Differences In First Year after Arrival: Non-English-Language Countries in North-West Europe



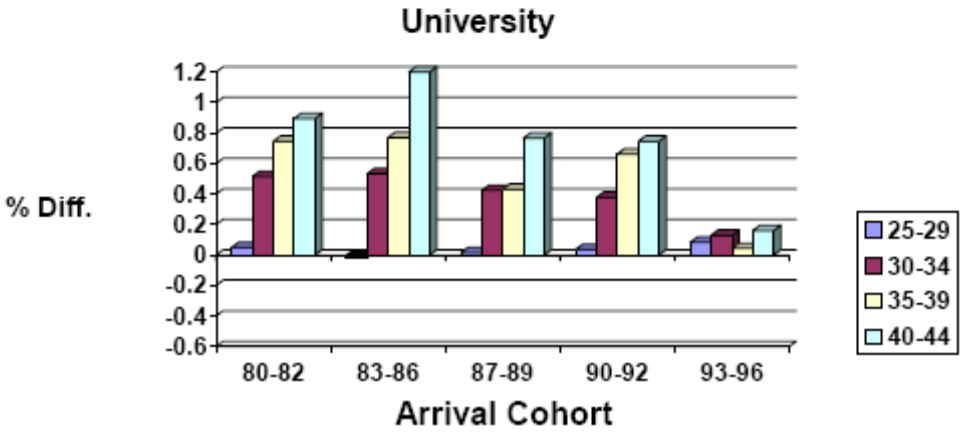


Figure B3
Immigrant/Native-Born Log Earnings Differences In First Year after Arrival: Non-English-Language Countries Outside of North-West Europe

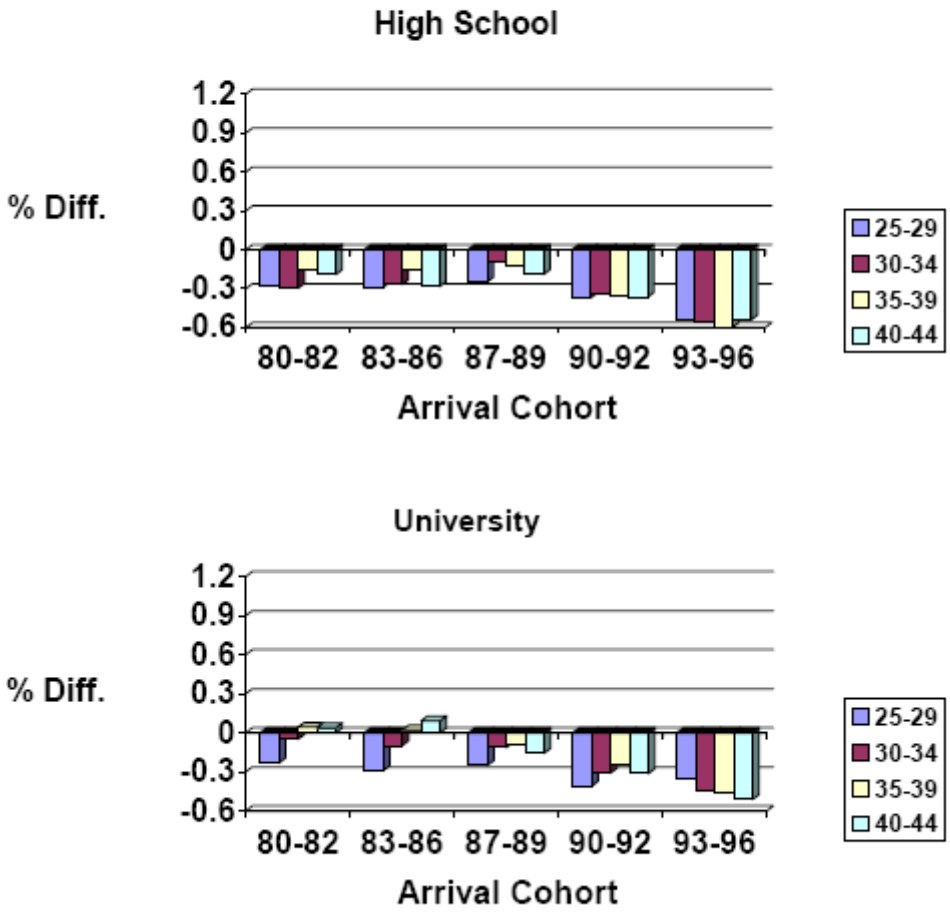


Table B1
Differences in Present Values of Earnings
Immigrant Cohorts Relative to Matching Native Born Cohorts
By Region of Origin
High School

English				
Cohort	25-29 at Arrival	30-34 at Arrival	35-39 at Arrival	40-44 at Arrival
1980-82	0.35 (.026)*	0.24 (.026)*	0.16 (.026)*	0.34 (.032)*
1983-86	0.11 (.040)*	0.036 (.032)	0.34 (.043)*	0.080 (.053)
1987-89	0.10 (.043)*	0.28 (.042)*	0.13 (.033)*	0.18 (.066)*
1990-92	0.36 (.082)*	0.18 (.087)*	-0.082 (.18)	0.29 (.10)*
1993-96	-0.018 (.25)	0.25 (.28)	-0.29 (.53)	0.77 (.45)+
Northern European				
Cohort	25-29 at Arrival	30-34 at Arrival	35-39 at Arrival	40-44 at Arrival
1980-82	-0.030 (.021)	0.014 (.030)	0.035 (.010)*	0.035 (.014)*
1983-86	-0.087 (.099)	-0.12 (.093)	-0.19 (.95)	0.064 (.031)*
1987-89	-0.094 (.031)*	-0.11 (.12)	-0.12 (.17)	0.044 (.028)+
1990-92	-0.045 (.070)	-0.10 (.58)	-0.21 (1.48)	-0.18 (.16)
1993-96	-0.49 (.57)	-0.39 (1.05)	-0.51 (.53)	-0.013 (.090)
Other				
Cohort	25-29 at Arrival	30-34 at Arrival	35-39 at Arrival	40-44 at Arrival
1980-82	-0.16 (.017)*	-0.15 (.019)*	-0.18 (.030)*	-0.27 (.029)*
1983-86	-0.14 (.017)*	-0.16 (.018)*	-0.23 (.025)*	-0.29 (.041)*
1987-89	-0.14 (.025)*	-0.14 (.026)*	-0.14 (.041)*	-0.25 (.029)*
1990-92	-0.24 (.054)*	-0.25 (.056)*	-0.26 (.065)*	-0.32 (.075)*
1993-96	-0.19 (.20)	-0.39 (.22)+	-0.19 (.23)	-0.69 (.27)*

* (+) Significantly different from zero at the 5 (10)% level of significance.
Standard errors in parentheses.

Table B2

Differences in Present Values of Earnings
Immigrant Cohorts Relative to Matching Native Born Cohorts
By Region of Origin
University

English				
Cohort	25-29 at Arrival	30-34 at Arrival	35-39 at Arrival	40-44 at Arrival
1980-82	0.24 (.027)*	0.26 (.027)*	0.31 (.028)*	0.46 (.026)*
1983-86	0.15 (.026)*	0.18 (.027)*	0.35 (.030)*	0.35 (.035)*
1987-89	0.23 (.049)*	0.38 (.039)*	0.29 (.042)*	0.51 (.052)*
1990-92	0.25 (.10)*	0.44 (.072)*	0.28 (.086)*	0.24 (.11)*
1993-96	-0.25 (.22)	0.32 (.29)	0.69 (.32)*	1.038 (.25)*
Northern European				
Cohort	25-29 at Arrival	30-34 at Arrival	35-39 at Arrival	40-44 at Arrival
1980-82	0.010 (.058)	0.20 (.029)*	0.26 (.035)*	0.20 (.033)*
1983-86	-0.026 (.047)	0.25 (.031)*	0.26 (.041)*	0.29 (.046)*
1987-89	0.26 (.044)*	0.27 (.050)*	0.20 (.043)*	0.12 (.041)*
1990-92	0.16 (.066)*	0.076 (.078)	-0.32 (.11)*	-0.066 (.25)
1993-96	-0.056 (.28)	0.46 (.17)*	-0.25 (.28)	-0.052 (.74)
Other				
Cohort	25-29 at Arrival	30-34 at Arrival	35-39 at Arrival	40-44 at Arrival
1980-82	-0.13 (.022)*	-0.10 (.024)*	-0.12 (.029)*	-0.17 (.046)*
1983-86	-0.23 (.026)*	-0.18 (.028)*	-0.16 (.033)*	-0.30 (.041)*
1987-89	-0.092 (.042)*	-0.11 (.045)*	-0.17 (.043)*	-0.34 (.045)*
1990-92	-0.22 (.057)*	-0.25 (.058)*	-0.39 (.053)*	-0.56 (.052)*
1993-96	-0.26 (.17)	-0.058 (.34)	-0.081 (.20)	-0.65 (.19)*

* (+) Significantly different from zero at the 5 (10)% level of significance.
Standard errors in parentheses.

C. The regression equation used in Green and Worswick (2004)

Green and Worswick (2004) divide immigrants into 24 groups according to age at arrival and area of origin and education. Each of these groups is pooled with natives that have the same education level (as the group of immigrants) and the following OLS regression is run

$$\begin{aligned}\text{Ln } Y_i = {} & C_1 + \sum_j \kappa_{j,N}(coh_j) + C_{2,N}YSE_i + C_{3,N}YSE_i^2 + \sum_j \alpha_{j,N}(coh_j * YSE) + C_{4,N}\text{Unempl.} + \\ & + Idummy * \left[\sum_j \kappa_{j,I}(coh_j) + C_{2,I}YSE_i + C_{3,I}YSE_i^2 + C_{4,I}\text{Unempl.} + \sum_j \alpha_{j,I}(coh_j * YSE) + \right. \\ & \left. + \sum_j \beta_{j,I}(coh_j * Fyear_i) \right] + C_{5,I}Idummy + C_{6,I}Fyear_i + U_i\end{aligned}$$